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U.S. CLEAN TECHNOLOGY & RENEWABLES

INITIATING COVERAGE: GREEN SHOOTS WILL TAKE TIME TO BLOSSOM

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Initiating Coverage: Green Shoots Will Take Time to Blossom

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While Near-Term Headwinds Remain, Rising Energy Demand a Long-Term Positive: "Once bitten, twice shy" sums up investor sentiment, which has reached a low point, bringing valuations in the clean technology and renewables sector at or below recessionary lows. However, despite near-term investor pessimism, rising energy demand spurred by global population growth, coupled with low market penetration, suggests a multi-year secular growth opportunity that is too big to ignore. The need to fill the gap between energy needs and what fossil fuels can provide, together with growing private sector investment even in a challenging macro environment, supports our more sanguine view in the long term. Balancing near-term headwinds and long-term positives, we initiate coverage with a Neutral view on the sector.

Despite a Challenging Environment, We See Pockets of Opportunity in Electric Vehicles and Energy Efficiency: As government stimulus and regulatory incentives diminish amid macro challenges and a focus on fiscal austerity, the next phase of development for the industry will be demand driven, fueled by technologies that provide an attractive cost/value proposition. We see pockets of opportunity in electric vehicles and energy efficiency over markets such as Light Emitting Diodes (LEDs) and solar, which are still digesting the dual challenges of overcapacity and tightening incentives. Consolidation driven by capital needs, scale, and high barriers to entry will accelerate in the next 6-12 months, enabling those that traverse to the next phase of the industry to capitalize on underpenetrated but significant market opportunities.

Our Top Picks are TSLA, ELT, AMRC, and PWER: Telsa Motors (TSLA) is our preferred stock in the electric vehicle space. The company is well positioned to capture market share as it provides a premium product to a premium consumer. In the energy efficiency space, we believe Ameresco (AMRC) is best placed to benefit from federal mandates. In smart grids, Elster (ELT) is best positioned to capture the next wave of stimulus spending in Europe, relative to its peers. Lastly, we consider Power-One Inc. (PWER)'s rising share in a comparatively less commoditized market in the solar food chain attractive. We also initiate coverage on AONE, FSLR, GTAT, and ITRI with 2-Equal Weight ratings.

Diminishing Incentives Pose Major Risk: The successful trajectory of select sub-markets depends on the ability to evolve into viable and competitive economic models. A prolonged macro recovery could derail opportunities for sector growth as select technologies would be unable to build the scale needed to compete with incumbent solutions.

Summary of our Ratings, Price Targets and Earnings Estimates in this Report

Company	Rating		Price	Price Target			EPS FY1 (E)			EPS FY2 (E)		
	Old	New	08-Nov-11	Old	New	%Chg	Old	New	%Chg	Old	New	%Chg
U.S. Clean Technology & Renewables	0-NR	**2-Neu**										
A123 Systems Inc. (AONE)	N/A	**2-EW**	3.16	N/A	**4.00**	-	N/A	**-1.92**	-	N/A	**-1.54**	-
Ameresco Inc. (AMRC)	N/A	**1-OW**	11.18	N/A	**14.00**	-	N/A	**0.76**	-	N/A	**0.92**	-
Elster Group SE (ELT)	N/A	**1-OW**	14.35	N/A	**18.00**	-	N/A	**1.10**	-	N/A	**1.22**	-
First Solar Inc. (FSLR)	N/A	**2-EW**	47.55	N/A	**52.00**	-	N/A	**7.05**	-	N/A	**7.94**	-
GT Advanced Technologies Inc. (GTAT)	N/A	**2-EW**	8.00	N/A	**9.00**	-	N/A	**1.53**	-	N/A	**1.66**	-
Itron Inc. (ITRI)	N/A	**2-EW**	38.17	N/A	**41.00**	-	N/A	**4.07**	-	N/A	**3.93**	-
Power-One Inc. (PWER)	N/A	**1-OW**	5.53	N/A	**7.00**	-	N/A	**0.82**	-	N/A	**0.68**	-
Tesla Motors Inc. (TSLA)	N/A	**1-OW**	31.84	N/A	**38.00**	-	N/A	**-2.15**	-	N/A	**-1.97**	-

Source: Barclays Capital Share prices and target prices are shown in the primary listing currency and EPS estimates are shown in the reporting currency.
FY1(E): Current fiscal year estimates by Barclays Capital. FY2(E): Next fiscal year estimates by Barclays Capital.
Stock Rating: 1-OW: 1-Overweight 2-EW: 2-Equal Weight 3-UW: 3-Underweight RS: RS-Rating Suspended
Sector View: 1-Pos: 1-Positive 2-Neu: 2-Neutral 3-Neg: 3-Negative

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OVERVIEW

Initiating on US Clean Technology & Renewables

The technology is clean; however, investing in the sector is messy.

When it comes to clean tech stocks, "once bitten, twice shy" probably sums up investor sentiment at present, and regular negative news flow only strengthens resolve to keep away from investing in the sector. However, **despite the multiple reasons to be shy of the space in the near term, there are still good reasons to keep it in focus for longer-term opportunities, and thus proceed with caution**. Most important, energy demand is not going away, it's increasing, along with the world's population. With fossil fuels only able to do so much, the supply gap will have to be filled by other sources of energy. Yes, investing in the clean technology and renewables sector is messy — complex, risky, uncertain — and the road to the future will be bumpy, but in our view, there are clearly pockets of opportunity both now and in the long term for those up to the challenge. Given expectations for near-term industry contraction — balanced by our view that the sector is still at the early stages of a secular growth cycle — and current modest valuations, we initiate coverage on the U.S. Clean Technology & Renewables sector with a 2-Neutral rating.

Will companies survive in the short term to thrive in the long term?

Diminishing incentives are accelerating the industry's maturation in the near-term.

Headwinds…Long adoption cycles, high investment requirements, complex end markets, and regulatory influence are some of the defining characteristics of the industry. Moreover, while investment levels in clean technology and renewables have been rising, recent developments such as declining government incentives that have been supporting growth over the last few years have increased concerns about the viability of various business models within the space. **The current backdrop is a combination of increased regulatory scrutiny and rising fiscal austerity measures, which are curbing incentive programs designed to help drive increased adoption**. In other words, key geographies that have historically provided supportive initiatives through regulatory policies are facing broader macroeconomic headwinds and thus the ability to support incentives is diminishing in what is still a nascent market. In our view, these factors have led to heightened attention on near-term execution because quite frankly there is limited visibility to how, and on what trajectory, many of these end markets will develop over time. From a public equities standpoint, valuation levels are at or below recent recessionary lows. This clearly indicates that investors are expressing their cautious view on the ability of companies to survive the near term in order to thrive in the longer term. Declining risk tolerance has also clearly impacted the entire sector regardless of specific end market trends or company-specific execution.

Penetration across multiple end markets is still low.

Tailwinds…While we expect near-term headwinds to persist, we do believe that there are significant near-term opportunities in the sector, and that broadly the clean technology and renewables space is still at the very early stage of a multi-year secular growth cycle. Across multiple end markets, penetration remains at the early stages. For example, electric vehicles represent a modest 1.3% of total automobile shipments globally, LEDs represent less than 2% of the total general lighting market, and renewables represent only about 3% of power generation globally. **Factors such as resource viability, economic sensibility and even national security in some cases will continue to drive developments and steady investment in the industry and provide longer-term tailwinds supporting broader growth.** After an expected period of consolidation, we believe the next phase of the industry's growth will be demand led, and thus look toward sectors within the broader industry that will be supported by sustainable demand improvement rather than incentivized supply growth.

Energy demand is not going away, it's increasing, along with the world's population.

With fossil fuels only able to do so much, the supply gap will have to be filled by other sources of energy.

Looking at the big picture, **by 2050, the earth's population is expected to reach 9 billion** (from 7 billon now) increasing the overall demand for energy as billions more people will be seeking energy resources. As a result, new and more efficient means of resource allocation and consumption will be needed. Near term, however, due to diminishing incentives, the industry is being forced into an accelerated maturation process. Therefore, companies that can bridge the gap from today's challenging backdrop to the next phase of growth should be well positioned to capitalize on what should be significant opportunities in the long term. We believe vendors that have proven technological advantages, have the ability to scale, are well capitalized, and have sustainable operating models are best positioned to make this transition in the near term, and position themselves to thrive in the long term.

US Clean Technology & Renewables – Quick Take

Investors will be best positioned by building exposure to those sectors that have comparatively less reliance on incentives.

As previously mentioned, we believe the next phase of the evolution of the clean technology and renewables sector will be demand led (rather than incentivized supply growth), and thus believe that investors will be best positioned by building exposure to those sectors that have comparatively less reliance on incentives. We recognize that the broader sector will continue to depend on government support and regulatory incentives, particularly since the sector is still at the early stages of development. However, we look for those areas that have less risk of further consolidation and can provide differentiated value to specific end markets, thus spurring ongoing and steady growth in demand.

Near term, we like the electric vehicle market the most.

By end market, we are thus relatively positive on the near-term outlook for the electric vehicle market, particularly vendors that provide comparative performance metrics to available internal combustion engine alternatives. We believe the increasing availability of broader options by established automotive OEMs should enable increased consumer awareness, and those vendors that cater to high discretionary income customers should be better positioned toward capitalizing on early adopters in the market.

The ESCO market is our next favorite.

We also like the energy efficiency market, which we believe is the "low-hanging fruit" of the clean technology and renewables space. We believe that the installation of newer, more energy-efficient solutions (e.g., lighting, building management systems) is the easiest way to reduce energy costs, particularly since residential and commercial energy use is one of the highest outlays in the U.S. market. In our view, the energy service company (ESCO) market is an attractive way to capitalize on broader energy efficiency trends, but also provides a stable longer-term tailwind given exposure to long-term, highly visible, cash-generative contracts.

We have a mixed view on smart grid stocks.

We have mixed views on the smart grid opportunity, particularly given the expected reduction in large contract awards in the United States over the next few years. As adoption cycles are generally slow among risk-averse utilities, we believe that the best way to gain exposure to the space is to position for upcoming stimulus/regulatory incentives which help to increase the deployment cycle of the technology. We see healthy demand beginning in late 2012/early 2013 driven by regulatory requirements in Europe and ongoing traction internationally, and thus would look toward an improvement in market demand in a year or two.

The two other markets that we examine — the LED market and Solar market — share similar qualities. Both are: 1) somewhat dependent near term on regulatory incentives to drive adoption, though the latter more so; 2) impacted by pricing trends at tier-2 and tier-3 competitors, many of which are making little to no profit; 3) ripe for consolidation and, more likely, rationalization as select vendors need to exit the market in order to support the longer-term health of each industry. We thus do not consider it an opportune time to actively call the "survival trade" in the market, and would wait for further evidence of the stabilization of near-term trends to begin to look for longer-term plays in each market.

Figure 1: U.S. Clean Technology and Renewables Industry Snapshot

	Market Growth	Share Gains	Margin Expansion	Valuation	Risk/ Capitalization	Total
Automotive and Storage Technology	●	◕	◕	◔	◑	● ● ● ◔
Energy Efficiency Solutions: Energy Service Companies	◕	◑	◔	◕	◕	● ● ●
Energy Efficiency Products: Smart Grids	◑	◑	◔	◑	◑	● ● ◔
Energy Efficiency Products: Lighting	◕	◑	◔	◔	◑	● ● ◔
Energy Generation: Solar	◔	◑	○	●	◔	● ●

Source: Barclays Capital research

Our top sector picks are TSLA, AMRC, ELT, and PWER.

In choosing our picks for the sector, we align our ratings with our industry preferences and how to be best positioned for both near-term and longer-term expected market developments. We therefore initiate coverage on Tesla Motors (TSLA) with a 1-Overweight rating as our preferred play in the electric vehicle & storage technology subsector as we believe the company is well positioned to capture share in the electric vehicle market as a premium provider of automobiles. Our view on A123 Systems (AONE) is positive longer term, as we believe the company is well positioned to capture opportunities as an independent provider of batteries to the electric vehicle market. However, near-term dependency on emerging OEMs (e.g., Fisker, Smith Electric) is likely to remain a headwind, along with the company's stated need for further capital injection in and around 2013 to meet its strategic plan. We thus initiate coverage on AONE with a 2-Equal Weight rating.

In the energy efficiency space, Ameresco (AMRC) is our top pick. While we recognize that contract awards are likely to remain lumpy, particularly for the municipality, university, school and hospital (MUSH) markets, we believe longer-term trends for energy efficiency contracts are positive, particularly in the federal market. We thus consider Amersco's ESCO business model comparatively defensible in the current environment, and thus like its longer-term visibility and cash generative characteristics.

Looking to smart grids, we expect market growth to remain steady, punctuated by periods of acceleration due to regulatory incentives/government stimulus. Moreover, as utilities are largely risk averse, we believe competitive displacement is less likely, and thus look for vendors positioned to capitalize on the next wave of stimulus/regulatory supported spending for opportunities in the smart grid sector. Elster (ELT) emerges as our top pick in the sector, largely as it generates close to 68% of revenues from international markets, 45%

of which come from Europe where the next leg of spending should emerge in late 2012/early 2013. Ultimately, we believe that Itron (ITRI) should garner its fair share of international awards, though near-term headwinds associated with its North American business (the company's largest geography by reviews) along with a shift in its management keeps us on the sidelines for now.

In the LED arena, we are reducing our outlook for the market, and thus remain cautious broadly in the sector. However, we are not changing our prior view on the sector, whereby we continue to favor the component vendors (CREE and LEDS) over the equipment suppliers (VECO, AIXG), though our industry caution keeps us at a 2-Equal Weight on all of the stocks within the sector.

Finally, with respect to solar, as recent preannouncements have highlighted (too numerous to list in a concise format), the industry continues to remain under pressure given limited visibility on the trajectory of demand against a backdrop of diminishing subsidies. We do believe that there is a light at the end of the tunnel, and look for recent pricing declines across the food chain to accelerate the ability to achieve grid parity. However, while we believe all of our covered companies within the solar sector will be survivors, we believe it is too early to advocate going full speed into solar given limited visibility on when stability in the market will emerge. Power-One (1-Overweight) is our top relative sector pick as we believe the company is well positioned to gain share in the growing North American and Indian markets, and we believe the inverter market is less likely to be commoditized vs. other areas of the solar value chain. That said, we recognize that the company's performance is unlikely to be completely divorced from broader solar market demand where we continue to see downward pressure. We also initiate coverage on First Solar (FSLR) and GT Advanced Technologies (GTAT) with 2-Equal Weight ratings.

Figure 2: U.S. Clean Technology and Renewables Company Initiation Snapshot

Company	Ticker	Rating	Current Price	Price Target	Market Growth Potential	Potential For Share Gains	Likelihood of Margin Expansion	Barriers to Entry	Capital-ization	Risk Profile	Valuation
Automotive/Storage											
Tesla	TSLA	1-OW	$31.84	$38.00	●	◕	◕	◕	◑	◑	◔
A123 Systems	AONE	2-EW	$3.16	$4.00	●	◑	◑	◑	○	○	◑
Energy Efficiency Solutions: Energy Service Companies											
Ameresco	AMRC	1-OW	$11.18	$14.00	◕	◕	◔	◑	●	◕	◕
Energy Efficiency Solutions: Smart Grids											
Elster	ELT	1-OW	$14.35	$18.00	◔	◕	◑	●	◑	◕	◕
Itron	ITRI	2-EW	$38.17	$41.00	◔	◑	◑	●	◑	◑	◑
Energy Generation: Solar											
Power-One	PWER	1-OW	$5.53	$7.00	◔	◕	◑	◕	●	◑	◑
GT Advanced Technologies	GTAT	2-EW	$8.00	$9.00	◔	◕	◔	◑	◕	◑	◑
First Solar	FSLR	2-EW	$47.55	$52.00	◔	◑	◔	◑	◑	◑	◑

Source: Barclays Capital, FactSet. Pricing is as of 11/8/11 market close. Stock rating: 1-OW = 1-Overweight; 2-EW= 2-Equal Weight. Sector rating is 2-Neutral.

Defining the US Clean Technology & Renewables Sector

We define the sector as companies that are focused on optimizing/enhancing energy production or utilization while minimizing associated costs.

Defining what makes up the U.S. Clean Technology & Renewables space is somewhat of a difficult task given the vast number of markets that are a part of the broader industry. A common theme among participants is that they are all looking to optimize or enhance energy production and/or utilization while minimizing associated costs.

For practical purposes, we segment the market into four major categories:

1) Energy Generation (non-fossil fuel resources such as solar, wind, biomass, and geothermal),

2) Automotive/Energy Storage (electric vehicles and energy storage technologies),

3) Energy Efficiency Solutions (smart grids, comprehensive energy efficiency practices, facilities management), and

4) Energy Efficiency Products (lighting, building materials)

Figure 3: U.S. Clean Technology and Renewables

Market	Sub-Market	Key Drivers	Key Challenges	Covered Companies
Automotive/Energy Storage	EVs and Batteries	• Rising energy prices • Timely product launches • Strong initial momentum	• Range anxiety • Reliance on government support • Tempered macro backdrop	• Tesla Motors (1-OW) • A123 Systems (2-EW)
Energy Efficiency Solutions	Energy Service Companies	• Budget-neutral solutions • Significant market opportunity • Ongoing regulatory support	• Highly fragmented market • Rising risk profile for MUSH markets	• Ameresco (1-OW)
Energy Efficiency Solutions	Smart Grid	• Growing global market with steady adoption cycle • Diversified end market • Limited competition	• Adoption cycle timing is key • Maturing North American market • Low priority for utilities	• Elster (1-OW) • Itron (2-EW)
Energy Efficiency Products	Lighting/LEDs	• Reduced energy consumption • Higher efficiency	• Material pick up in production capacity coupled with weaker demand has led to overcapacity	• Cree (2-EW) • Aixtron (2-EW) • Veeco Instruments (2-EW) • SemiLEDS (2-EW)
Energy Generation	Solar	• Lower costs improve value proposition • Expanding global market	• Manufacturing overcapacity • Shifting market dynamics (away from historically robust geographies) • Diminishing government support	• Power-One (1-OW) • First Solar (2-EW) • GT Advanced Technologies (2-EW)

Source: Barclays Capital. Stock rating: 1-OW = 1-Overweight; 2-EW= 2-Equal Weight. Sector rating is 2-Neutral.

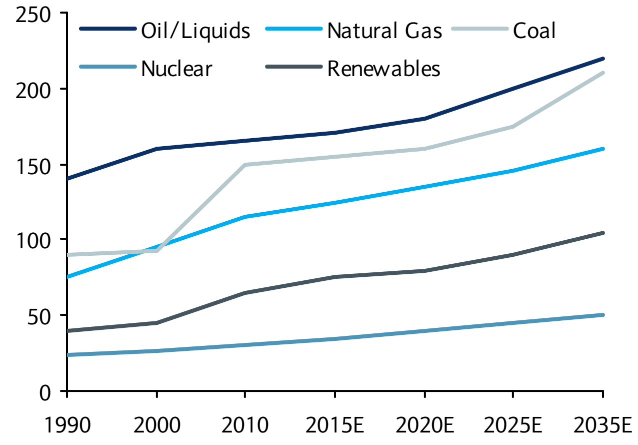
Assessing Market Penetration: The Big Picture

Though contribution has gradually been rising, renewables still account for less than 16% (incl. hydro) of overall energy consumption globally.

The 2010 global energy and electricity consumption was roughly 525 quadrillion Btu and 21.5 trillion kWh, respectively. Historically, and to this day, the majority of this energy consumption comes from fossil fuels, which make up approximately 80-85% of total energy consumed. However, over the last several years, the penetration rate of renewable sources (including hydropower) has being increasing, making up around 12% and 10% of energy and electricity, respectively, in 2010. The growth of renewables has largely been due to government support on a national and international level through the award of tax credits, subsidies, grants, and national long-term targets and standards.

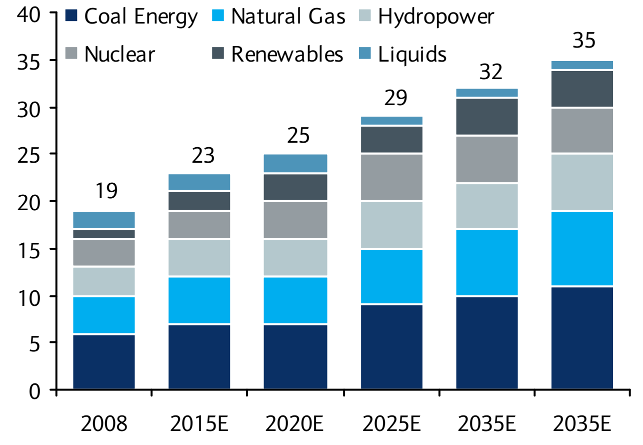
We do not expect a sizeable jump from renewable contribution to total energy in the near term, but do expect a slow and steady adoption of alternative energy sources over the long term as countries hedge against increasing energy prices and focus on initiatives to drive energy independence. Specifically, we expect solar, wind, and biomass adoption to drive the growth of the renewables mix in the electricity market.

Figure 4: Global Energy Mix and Outlook (quadrillion Btu)



Source: U.S. Energy Information Administration (EIA)

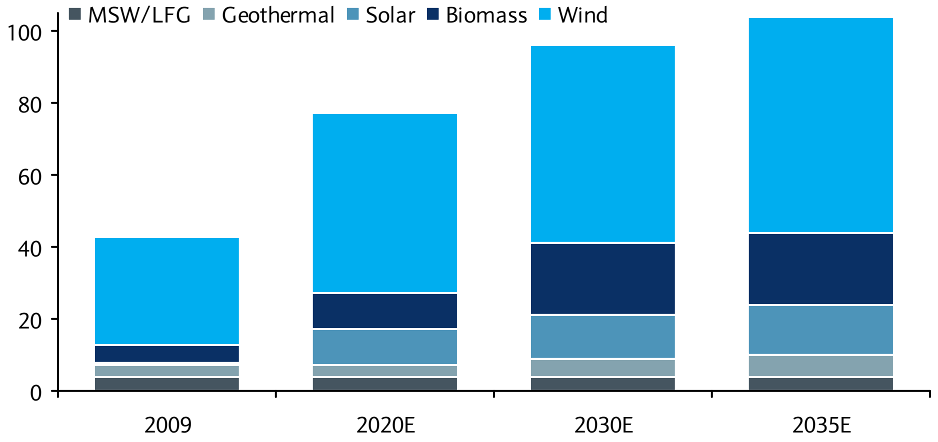
Figure 5: Global Electricity Mix and Outlook (trillion kWh)



Source: U.S. Energy Information Administration (EIA)

According to the U.S. Energy Information Administration (EIA), global renewables penetration (excluding hydro) will grow at a 3.5% CAGR from 2009 through 2035. This growth is expected to be driven primarily by the solar industry growing at a forecast CAGR of approximately 11%. In absolute terms, the EIA expects renewable capacity and generation to primarily come from wind, which is forecast to represent 58% of the renewable capacity in 2035, down from 70% in 2009.

Figure 6: Renewable Energy Capacity Forecast (GW)



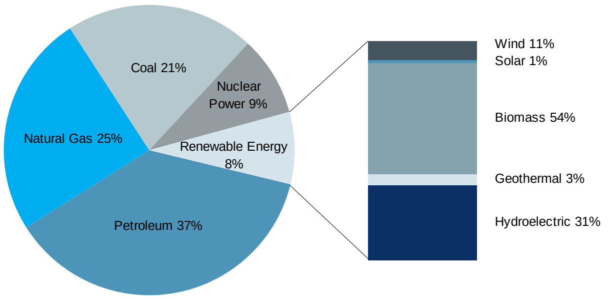
Source: U.S. Energy Information Administration (EIA). MSW = municipal solid waste. LFG = landfill gas

In the US, regulatory initiatives such as ARRA and various state mandates have driven renewable penetration.

In the United States, despite the recent economic recession, investment in overall renewables and associated penetration increased. This growth was primarily fostered by regulatory initiatives such as the American Reinvestment and Recovery Act (ARRA) which offered grants and other incentives to utilities and energy providers. Additionally, 37 states and the District of Columbia have some type of renewable portfolio standard or mandate which requires energy electricity providers to incorporate a share of electricity from renewable energy sources via acquisition or production.

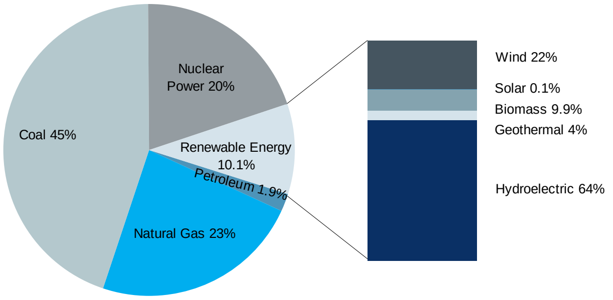
According to the U.S. EIA, the largest end user driving renewables adoption has been the transportation sector over the last several years due to the growth of biofuels. If we discount hydropower from total renewable U.S. energy consumption, wind, geothermal and solar all grew, to 19%, 10.5%, and 2.1% in 2009, from 13.8%, 1.9%, and 0.4% in 2005. Similar to our overall expectation in the global energy and electricity market, we expect an increase in the renewables mix specifically for electricity generation by way of wind and solar and biofuels commanding the growth in overall U.S. energy consumption.

Figure 7: 2010 U.S. Energy Mix (97.89 quadrillion Btu)



Source: U.S. Energy Information Administration (EIA)

Figure 8: 2010 U.S. Electricity Mix (3.61 bn kWh)



Source: U.S. Energy Information Administration (EIA)

Understanding Grid Parity

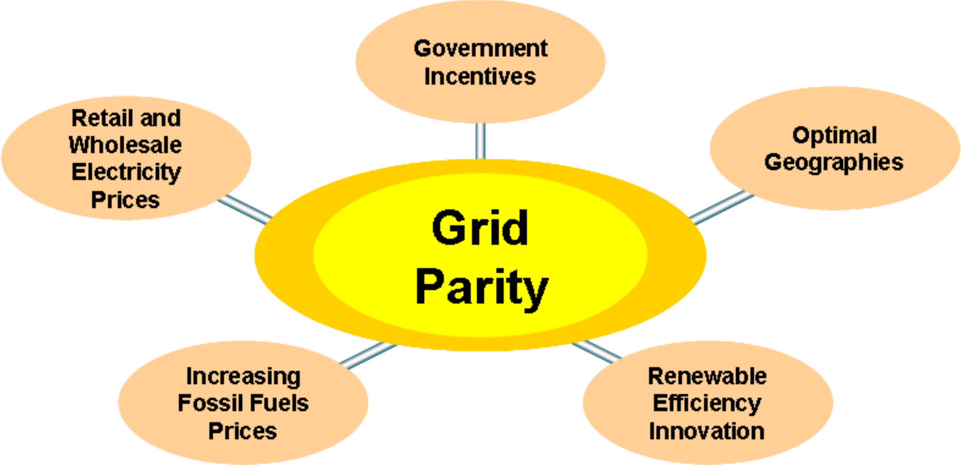
Grid parity, the point where the cost of renewable energy equals the cost of traditional energy, is the ultimate goal of the industry in order to spur widespread adoption.

Grid Parity is the term that is most commonly used when discussing the adoption and growth of renewables in the power generation industry. On a high level, **grid parity is the point at which the cost of renewable electricity, like wind and solar, is equal to the cost of conventional electricity**. The idea is that if a region reaches grid parity, the adoption cycle for using energy generated from renewable sources is likely to accelerate. Given limited cost differential, utilities and energy providers would find renewables increasingly attractive because of better pricing and a potential incentive to select the environmentally cleaner option and potentially self-sustaining resources.

A common misconception is that grid parity is this metaphoric finish line that all manufacturers, utilities, and energy providers are racing toward. Many consider grid parity to be the much needed inflection point within the entire renewables industry. While we agree to some extent, there are many variables that affect grid parity and we shouldn't expect an immediate increase in demand following parity in renewable and traditional electricity pricing. In fact, we believe grid parity is a fluid concept that is always moving with no clear end point. Below we have highlighted several factors to consider when thinking about grid parity.

Grid parity is a moving target and is dependent on the influence of a number of different factors.

Figure 9: Grid Parity Matrix


Government Incentives
Retail and Wholesale Electricity Prices
Optimal Geographies
Grid Parity
Increasing Fossil Fuels Prices
Renewable Efficiency Innovation

Source: Barclays Capital

- **Government incentives:** The purpose of government subsidies and feed-in tariffs is to bring down the retail and wholesale price of renewable electricity enough to compete with traditional sources. In the near term, energy providers and renewable industry experts analyze grid parity, taking government incentives into consideration. However, the long-term goal is to have renewable energy pricing come down enough to make the resource cheap enough that substituting fossil fuels with solar or wind is entirely justified from a cost perspective.

- **Optimal Geographies:** One of the most important but overlooked factors affecting grid parity is the geography of any solar farm site. Solar panels would make more sense in a place with high levels of sun radiating for longer amounts of time than cooler and darker places. The European Photovoltaic Industry Association (EPIA) predicts that Italy, Germany, and Spain can reach grid parity by 2014, 2017, and 2016, respectively. Italy is at the front of the list because in addition to high electricity costs, Italy falls under the Sunbelt yielding high levels of irradiation. On the other hand, despite being the leader in PV installations, Germany struggles as it has similar irradiation levels to Alaska. Similarly, wind turbines will run longer in areas that are closer to water with more exposure to wind.

- **Renewable Efficiency Innovation:** One of the reasons renewable costs are high is because of the efficiencies associated with solar cells. As the efficiencies of solar cells improve, the amount of energy gathered from each cell will also improve, thereby increasing overall energy absorption and decreasing energy costs. We do not expect innovation to be the primary driver toward grid parity, but do expect it to be an important factor in helping achieve grid parity.

- **Increasing Fossil Fuel Prices:** Fossil fuels are depleting resources with a limited lifespan of 40-60 years. Over time, as fossil fuel costs increase as a result of increasing demand and decreasing supply, stable to improving renewable energy costs will increasingly become more attractive, driving the industry toward grid parity.

- **Retailing/Wholesale Electricity Prices**: The retail and wholesale prices of electricity vary in every region and adoption cycles will accelerate where conventional electricity costs are already high. For example, the only U.S. state to reach grid parity thus far is Hawaii. This is primarily because Hawaii, with high levels of sunshine, uses diesel-generated electricity which costs $0.30/kWh, making generation from alternative energy sources logical.

In our view, grid parity in the US is still at least a few years away.

Currently, the average cost of residential electricity to the end user in the United States varies between $0.08 and $0.12 per kWh, implying that different areas will reach grid parity at different times. On the other hand, residential solar prices cost between $0.30 and $0.65 per kWh according to Solarbuzz. The variance is even greater globally and is generally dependent on traditional energy pricing. Various industry studies along with our own checks suggest that U.S. solar power will reach grid parity somewhere between 2013 and 2015.

Key Themes

Despite the different companies that participate in the sector, a number of common traits exist.

While the renewable and clean technology sector comprises multiple end markets, some common themes and trends have clearly emerged, impacting and influencing participants in the industry. They include the following:

Steady Adoption Cycles

Many of the end markets that are part of the renewables and clean technology space are fundamentally looking to transform how energy is generated, the manner by which it is stored, and the means by which it is consumed. These are not small tasks and will require changes in multiple stages and areas of the adoption cycle. For example, mass market adoption in many of the submarkets within the clean-tech industry is likely to require changes in consumer and business behavior, processes used by utilities, infrastructure investment, as well as sponsorship from various regulatory agencies, often on a coordinated basis. In our view, success — defined by the ability to penetrate legacy practices — will ultimately be measured in years rather than quarters.

Given the magnitude of change required to adopt various clean-tech solutions, the adoption cycles across different markets are going to be steady.

This is not to say we don't expect pockets of growth within the sector. Solar panel installs were up 45% in 2010 in the U.S. alone while worldwide panel shipments were up 72% from 2009 levels according to Frost and Sullivan. We are currently estimating the electric vehicle market to grow at a 45% CAGR between now and 2020. The LED market is poised to grow by 30-35% over the next several years driven largely by traction in general lighting. However, within the context of the markets that each of these sectors is looking to tackle (i.e., energy generation, automobiles, general lighting) we expect gradual penetration over time.

Figure 10: End Market Penetration and Growth Trajectory

End Market	Market Size	Penetration	Growth Outlook
Electric Vehicles	72mn units	>5%; 940,000 units	45% CAGR 2012-20 yielding 4.8mn units by 2020 globally
Smart Grid/Meters	24bn meters/$60bn	10-15%; 2.9 bn meters with automation/smart	16% CAGR 2011-14 worth $171bn
Lighting	$80bn	1-2%; $1.2bn	33% CAGR 2011-15
Solar	4,950 GW of power generating capacity	1-2%; 60 GW of installed capacity	30.1% CAGR 2010-15 yielding 157 GW of installed capacity

Source: Barclays Capital

Technology Differentiation is Good

While technology differentiation is key, we do not believe it is enough to determine industry success.

Technology differentiation can result in a high barrier to entry (one of our core criteria for determining investment opportunities) for a specific market. However, we do not believe that technology differentiation in and of itself is key to determining success in the renewables and clean technology space.

Costs, both absolute and relative, must also be taken into consideration.

We believe it is more effective to consider technology differentiation within the framework of absolute costs (costs to deploy, maintain, and in some cases, cost of disposal) and relative costs (competing technologies within the same sector and comparable technologies in other tangential sectors). For example, private solar panel manufacturer Solyndra claimed its cylindrical CIGS thin-film solar panels would improve energy absorption as well as reduce the total balance of system cost of an implementation. Whether or not ultimately its technology could have been a differentiator in the market given the opportunity to mature, the company will never get the opportunity to prove it, as pricing for crystalline modules came in so rapidly that Solyndra could not compete on a cost basis.

Getting to Scale Is Better

Given the up-front costs required to just become a player in various submarkets, getting to scale is critical for longer-term success.

The ability to be at scale or even have solid visibility on how to achieve scale is critical in the renewables and clean technology space. This is not an easy task of course given the amount of up-front fixed costs associated with getting a business up to scale in order to make a material impact on any one of the markets in the clean-tech space. For example, Tesla Motors raised approximately $1 billion of funding through venture capital, two rounds of funding in the capital markets, and a handful of government loans and grants. The company is still several months to a year away (i.e., expected 2H12) from hitting commercial volume launch of its first mass market vehicle.

Fiscal Austerity Accelerates Business Model Scrutiny

With rising fiscal austerity, we expect increased scrutiny on business model viability.

Rising fiscal austerity is clearly a headwind impacting the trajectory of the clean-tech sector and ultimately tightens the time horizon in which a company gets to prove its viability as a stand-alone operating business. The United States, Europe, and China have dedicated significant funds over the past few years to drive innovation within select markets. For example:

- The Chinese government issued $30bn in credit in 2010 to its top solar companies
- The U.S. Department of Energy has loaned $36bn since the establishment of its loan programs office in 2005
- The European Energy Commission has allocated €2.7bn for renewable energy since 2009

In the US, high-profile bankruptcies have raised questions about innovation investments.

However, as government budgets are increasingly pressured globally and at all levels, “innovation investments” are coming into question. In the United States, the recent bankruptcies of Solyndra, which secured a $535 million loan from the Department of Energy (DOE) Loan Guarantee Program, and Beacon Power, recipient of a $43 million loan, have cast a shadow and heightened regulatory scrutiny over the federal government’s support for various clean technology initiatives.

Recently, German Chancellor, Angela Merkel, expressed concerns about the long-term viability of the solar market in Germany and whether feed-in tariffs, which have substantially been reduced, should be lowered even further. The chancellor’s comments were particularly concerning given that Germany is the world’s largest solar market.

Given limited visibility on the sustainability of various supportive regulatory initiatives, we believe that those companies that are dependent on incremental support may face a tougher time in the coming years than in recent years.

The Need to Be Well Capitalized Is Quintessential

Companies with a stable capital structure are going to be the best positioned to navigate current near-term challenges.

A number of examples in recent months have highlighted that being well capitalized is crucial for navigating the current environment in the clean technology sector. The need for strong capitalization has intensified in recent quarters as structural challenges to select end markets has forced some vendors and the broader investor community to analyze the viability of some companies (e.g., Evergreen Solar, SpectraWatt); this, combined with increased challenges in accessing capital (e.g., challenges in capital markets, declining government involvement) points to a more challenging environment. Moreover, as deployments in the renewables/clean technology space occur over a longer period, "bankability" of vendors is important. For example, utilities are unlikely to work with solar panel providers or smart grid vendors that cannot honor a warranty on their products for multiple years. We therefore believe heightened scrutiny of balance sheets is here to stay and will likely be a key characteristic by which investors segment companies in the space.

Consolidation, and Rationalization, Should Continue

Consolidation, and more important, rationalization, which has already begun, is likely to accelerate in coming months.

A recent trend in the renewables and clean-tech space is consolidation. Merger and acquisition (M&A) activity has been strong over the last several years and we expect this to continue.

There are three reasons we expect consolidation, and its subsequent rationalization, to continue across the broader industry:

1) Struggling balance sheets give larger developed players the opportunity to acquire smaller players that have been unable to reach scale but have strong technologies,

2) Companies are looking to expand revenue streams downstream in order to further embed themselves into a market's value chain, and

3) Acquisitions often convert to new technologies and project portfolios, and allow geographic expansion.

With feed-in tariffs and government incentive programs declining, companies with strong balance sheets are acquiring companies with weaker balance sheets. In the solar space, we have seen a lot of this type of consolidation, where smaller companies that were lacking low-cost platforms were unable to compete with the integrated players as government incentive programs were tightened.

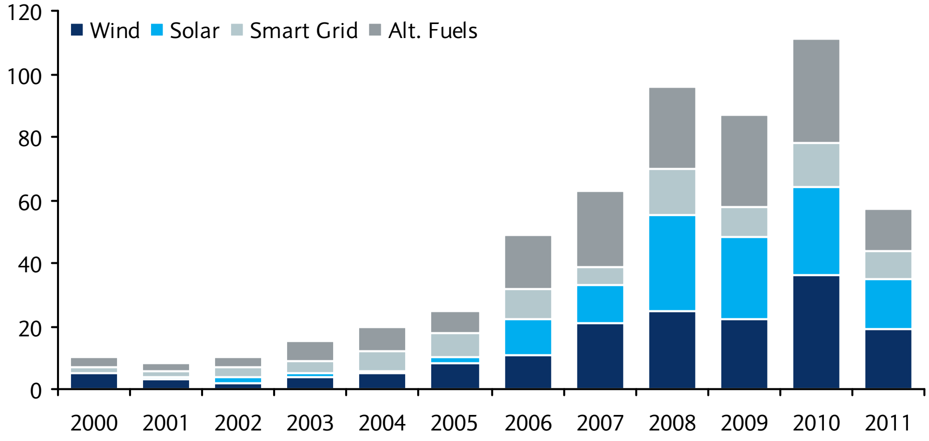
Second, as upstream manufacturers dealt with input cost pricing concerns (e.g., poly pricing), a common way they would hedge risk is by acquiring downstream players. For example, with wafer outsourcing proving to be costly and the price coming down, MEMC acquired SunEdison because MEMC needed a vehicle to build a pipeline and SunEdison needed a stronger balance sheet to continue operations. In the LED arena, Cree recently acquired Ruud Lighting in order to bolster its systems business. The strategy behind the acquisition is to get the company closer to the end market through stickier systems deals while also funneling business for its component business.

Finally, clean energy companies have been aggressive with respect to acquisitions in order to acquire new pipelines or project portfolios and enhance geographic positioning. In the

ESCO business, relationships with the MUSH markets (municipalities, universities, schools, and hospitals) in different locations across the industry are essential to winning awards. Ameresco made 13 acquisitions over ten years largely to develop its pipeline and gain share in markets it hadn't yet penetrated geographically. Effectively these acquisitions have provided the company with expanded scale, local assets, and geographic breadth to help support growth.

Figure 11 below illustrates the overall increasing trend in the deal pipeline in the renewables and clean technology sector. Despite 2009 levels slightly lower than 2008, deal flow still remained relatively robust and bounced back even stronger in 2010. We can continue to expect consolidation in the space for the reasons highlighted above.

Figure 11: Number of Deals by Technology



Source: CapIQ Barclays Capital
Note: Deals defined as Private Placements and M&A, 2011 (Jan. – Sept.)

Additionally, for those vendors that are unable to reach scale, have proven technological advantages or are under-capitalized, rationalization is likely to follow. Solyndra is a high-profile company to have followed this path, but is certainly not the first and will unlikely be the last. Other notable names have been Evergreen Solar and SpectraWatt in the solar area, Think Global in the electric vehicle market, Cardinal Fastener & Specialty Co. in the wind market, and recently bankrupt Beacon Power in the energy efficiency market.

Survival Today Does Not Equate to Success Tomorrow

Many companies that make it to the other side of the period of consolidation are likely to face different market dynamics in the longer term.

Just because a company survives the current environment and makes it to the next phase of the market following a period of consolidation and rationalization, it doesn't mean that its survival will translate into prosperity. There are fundamental structural changes occurring across select end markets within the broad renewables and clean technology industry. For example, given price levels in the solar module sector, it is unlikely that a return to prior gross margin levels for solar module manufacturers will materialize. This is why many are attempting to move downstream in order to bolster their revenue and margin profile and provide stickier solutions to the end market. Additionally, the pace of innovation requires companies to continue to compete as a scalable more efficient technology will make existing ones obsolete. In our view, many companies that make it to the other side of the period of consolidation are likely to face different market dynamics that could influence their ability to thrive despite managing through the current period of consolidation.

Sentiment Is at a Low Point

Regardless of metric, sentiment is clearly at a low point as investors are not discriminating between different segments within the overall sector.

Investor sentiment is at a low point given the market environment and a natural risk aversion toward emerging technologies. Consequently, we believe valuation levels appear attractive compared to historical levels for most if not all of our market segments. As the charts below highlight, companies across the clean-tech sector are trading near recessionary lows on both a price-to-earnings (P/E) and price-to-book value (P/B) basis. However, cheap valuation doesn't always translate into value. In an industry where valuation is low across the board, investors will increasingly target specific equities that have the potential to perform — specifically, vendors positioned for strong market share in an expanding industry with attractive and potentially improving margins.

Figure 12: Indexed FY2 Forward P/E

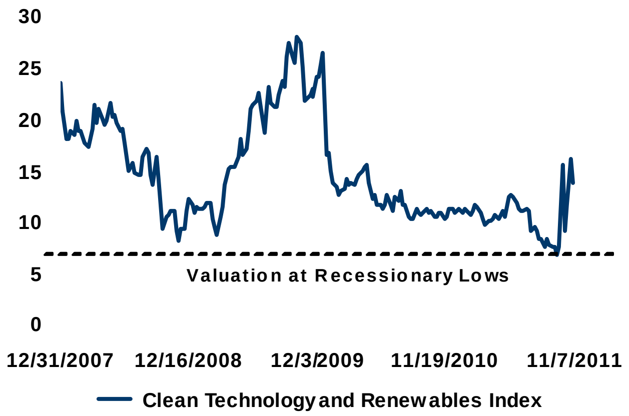
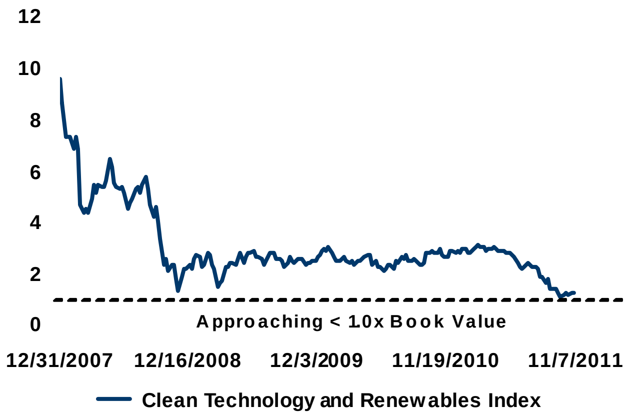


Figure 13: Indexed Price to Book Value



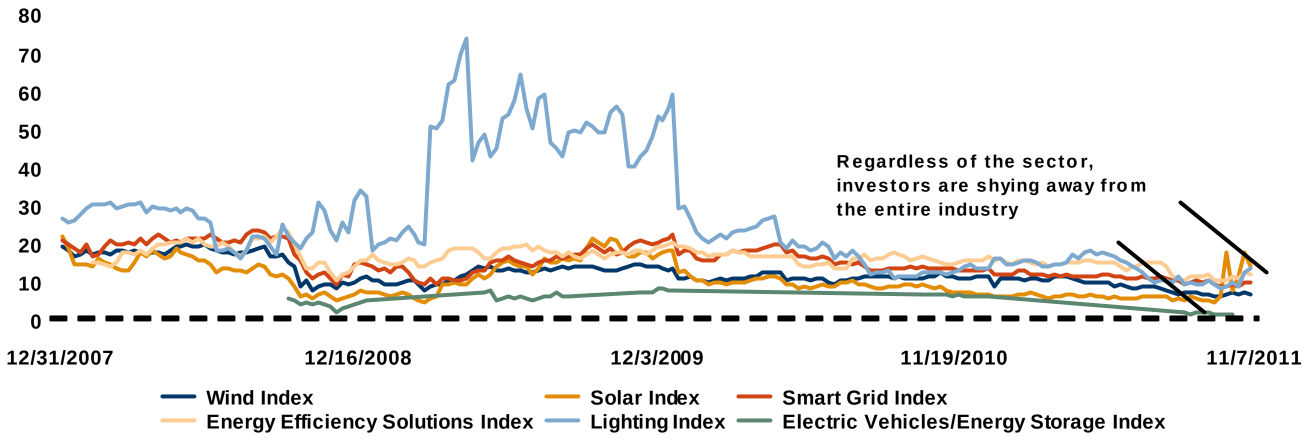
Source: FactSet, Barclays Capital
Note: Index Includes - ABAT, AIXG, AMRC, AONE, CREE, CSIQ, DQ, ELT, ESE, GCL, GTAT, HSOL, IBE-MCE, ITRI, JASO, JKS, LDK, LEDS, MY, OCI, PWER, Sinovel, SOL, SPWRA, STP, TSL, TSLA, VECO, VWS-CS, WCH-ETR, WFR, YGE

On a P/E and P/BV basis, the clean-tech sector is trading at or near recent recessionary lows.

On a P/E basis, as highlighted in the Figures above, the U.S. clean technology & renewables sector is clearly trading at recent recessionary lows. Similarly, when considering price to book, stocks appear to be trading close to book value, reiterating that overall sentiment in this sector is at a low point.

What is interesting to note is that the market over the last 6-12 months has not been discretionary about which section in the clean technology space a company sits. As the chart below illustrates, regardless of the end market, most sectors in clean tech have been pushed to historical lows with respect to valuation. This is no surprise as the broader market has been clearly risk averse and companies with limited visibility, that are dependent on subsidies, and are at the early stage of an adoption cycle, are clearly not in favor.

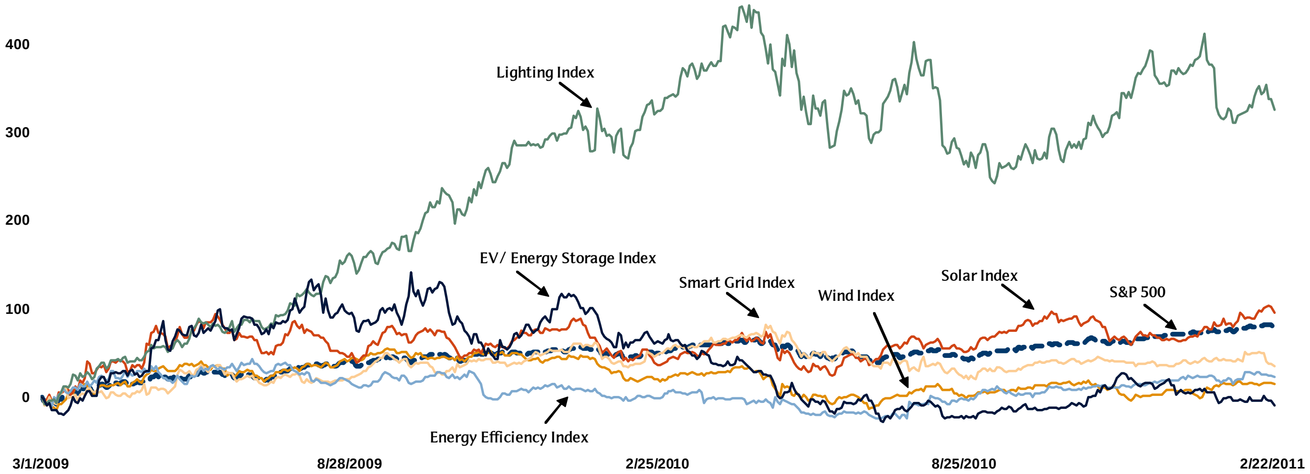
Figure 14: Sectorized FY2 P/E of Indices in Clean Technology & Renewables Sector



Source: FactSet, Barclays Capital

Does this mean there isn't any value? We don't believe so. Look at the prior market recovery (March 2009 to Spring 2011) for an example of how investors were positioned for the subsequent upturn. Clearly, after the market bottom, investors looked to specific areas of the clean technology food chain to drive outperformance.

Figure 15: Relative Price Performance of Indices in Clean Technology & Renewables Sector



Source: FactSet, Barclays Capital
Wind: IBE-MCE, MY, Sinovel, VWS-CS
Solar Index: CSIQ, DQ, GCL, GTAT, HSOL, JASO, JKS, LDK, OCI, PWER, SOL, SPWRA, STP, TSL, WCH-ETR, WFR, YGE
Smart Grid: ELT, ITRI
Energy Efficiency and Solution: AMRC, ESE
Lighting Index: AIXG, CREE, LEDS, RBCN, VECO
EV/Energy Store: ABAT, AONE, TSLA

Regulatory Decisions Will Continue to Drive Market Development

Regardless of diminishing incentives, the industry will still be dependent on regulatory decisions.

Regulatory decisions will continue to drive market development. As previously highlighted, many of the end markets are still underpenetrated. While additional capital injections/stimulus funding may be unlikely, we still believe that regulatory mandates will continue to drive market development. Measures such as the Corporate Average Fuel Economy (CAFE) requirements in the United States and the EU 2020 Directive designed to make the entire European Union 20% renewable by 2020 are examples of supportive initiatives that may not require direct funding from various regulatory bodies but will still drive the direction of developments in the sector.

Material, Longer Term Opportunities Exist, as Markets Remain Underpenetrated…

Despite the aforementioned near-term challenges, longer-term opportunities are significant as the industry is still at the early stage of a multi-year upgrade cycle.

Beyond our near-term expectations of further consolidation and rationalization in the space, we do expect material opportunities. Throughout the industry, we have seen noteworthy pockets of growth that we believe demonstrates the long-term opportunity for companies that can survive. For example, solar panel installs were up 45% in 2010 in the U.S. alone while worldwide panel shipments were up 72% from 2009 levels according to Frost and Sullivan. We are currently estimating the electric vehicle market to grow at a 45% CAGR between now and 2020 The LED market is poised to grow by 30-35% over the next several years driven largely by traction in general lighting. However, within the context of the markets that each of these sectors is looking to tackle (i.e., energy generation, automobiles, general lighting) we expect gradual penetration over time.

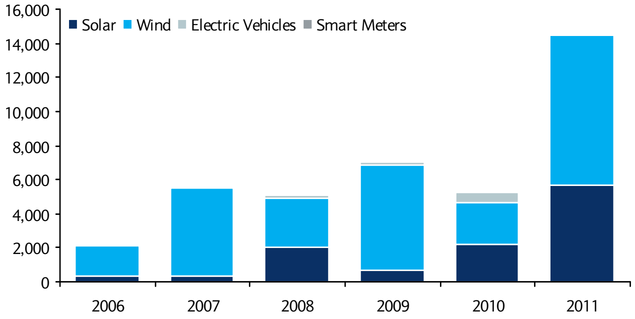
As previously highlighted, the renewables and clean technology sector is an industry focused on the optimization or enhancement of energy production and/or utilization while minimizing associated costs. Thus the industry itself will have to continue to receive investment because the very challenges it is looking to address are simply not going away and somehow need to be addressed.

...Which Will Keep Investment Focused on Innovation

The simple size of the opportunities within the renewables and clean technology sector will keep investment focused on innovation.

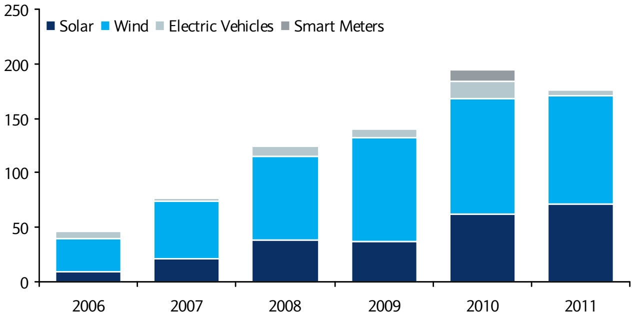
As mentioned, sentiment toward clean energy stocks is at a low point. Despite equity investors' hesitation toward clean stocks, we expect the pace of investment to continue as both corporate and venture investors increasingly find long-term value in clean technology and renewable innovations over the long term, particularly given the sizeable market opportunities. The charts below highlight the growing number of deals and the associated deal value. As we can see, there has been steady growth in the number of deals and a particularly large spike in deal value in recent years. This jump can be attributed to larger projects and higher profile deals between established players in the space, suggesting further traction in the adoption of clean technology.

Figure 16: Private Investment – Total Deal Value ($ mn)



Source: Dealogic, Barclays Capital, as of September 2011
Note: Includes VC and PE

Figure 17: Private Investment – Total Deal Number

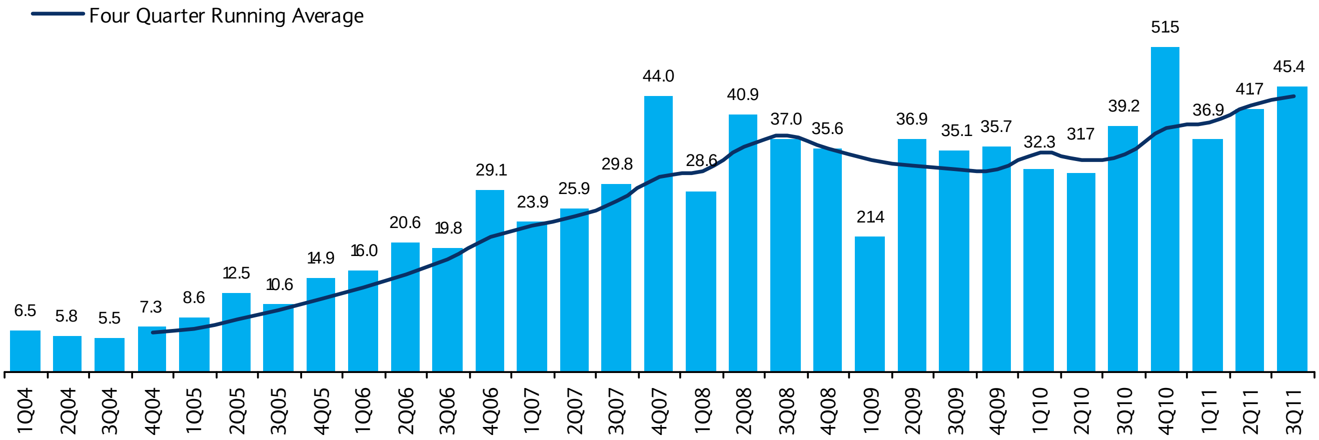


Source: Dealogic, Barclays Capital, as of September 2011
Note: Includes VC and PE

Even against the recent recessionary backdrop, industry investment continued on its upward trajectory.

Private investment in renewables and clean technology is somewhat different than other industries. In general (though there are exceptions), private companies in this market require a significant amount of start-up capital in order to validate their technology and get to scale. This implies they will require a significant amount of investment up front. However, initial funding requirements may go beyond what typical VCs may be able to provide and thus corporate or government sponsorship/support to drive the next leg of growth is often important. This need can extend the payback period for a typical private investor, but the hope is that the company's market opportunity is clearly significant in size and scope. We therefore believe that due to the size of the potential end market opportunities, innovation will continue to be funded.

Figure 18: New Financial Investment in Clean Energy ($ billion)



Source: Bloomberg New Energy Finance

Our Investment Framework

In seeking investment opportunities in the U.S. Clean Technology & Renewables sector, we base our assessment on each company's ability to meet or exceed the following criteria on a relative basis to our coverage universe:

- **Market Growth:** Simply enough, we are looking for companies that are positioned in growth markets. Although we prefer markets that are not dependent on various subsidies, we believe it is unrealistic to invest in any part of the U.S. clean-tech sector with the goal of solely investing in non-subsidized businesses. With that in mind, we look for markets that already have a supportive funding structure in place (with less risk for removal) and do not require additional/incremental measures. Given our investment horizon of the next 12-24 months, we look to separate near-term and long-term growth opportunities.

- **Potential for Share Gains:** Against a growing market backdrop, we look for vendors that are well positioned to gain share, thus providing opportunity to outperform market growth. We prefer companies that are able to differentiate based on technology, though recognize that the best technology — particularly in the renewable and clean technology sector — doesn't always succeed. Therefore, we also examine other factors driving share gains such as scale, lower-cost manufacturing, and positioning within key growth geographies/sub-markets.

- **Likelihood for Margin Expansion:** Ideally, for companies that are able to gain share in a growing market, we believe that those that can expand margins will clearly be best positioned to drive improved growth on their bottom line. We look to avoid scenarios that can lead to "profitless" prosperity, i.e., volume growth for the sake of volume growth. Select markets within the broader industry (e.g., solar modules) are commoditizing rapidly and therefore the inability to at least sustain margins will ultimately hinder the ability to drive earnings growth even as volumes improve.

- **Barriers to Entry:** Our preference is to seek out companies that work in markets with high barriers to entry based on sustainable technological differentiation. We also recognize that in some select markets scale and even brand are important in sustaining market positioning as well. In our view, high barriers to entry add an element of sustainability to a company's ability to drive earnings growth, particularly in combination with the other criteria mentioned previously.

- **Capitalization:** Although a solid capital structure is critical for success in most industries, it is particularly relevant in the renewable and clean technology arena at the current juncture of the industry's evolution. Given concerns around the trajectory of end market demand, potential for either increased scrutiny around, or flat out removal of, third-party funding/supportive initiatives, the need for a healthy capital structure is critical. This is particularly true in project-oriented, warranty-dependent businesses where a customer needs to minimize counterparty risk. This is not to say that we shy away from companies that have debt. We believe that companies will require a certain amount of leverage in order to build scale in order to capitalize on several promising end markets. In our view, it is the right amount of debt or third-party funding that needs to be assessed as well as the company's ability to service that debt.

- **Risk:** As many of the companies in the clean-tech sector are still at the early stage of development, either as a company or with respect to their broader industry, inherently there is a higher degree of risk associated with the sector relative to others. However, based on our "risk" criteria, we assess which companies in our coverage universe have the highest risk in executing their respective plans, be it dependency on government grants, pending awards, or the need for additional capital. While somewhat subjective, we try to apply similar criteria across all of our companies regardless of end market.

- **Valuation:** In our view, valuation should be used as a means to find an appropriate entry or exit point rather than as a driving factor governing an investment decision in the U.S. clean-tech sector. Most of the stocks in the sector are “cheap” based on historical trading multiples. As discussed earlier, some are even trading below their book value. However, without a meaningful combination of the prior criteria, we do not consider valuation in and of itself a principle driver of our investment framework. Similarly, we believe it is difficult to call a bottom based on valuation alone if improvements are not expected in any of the above criteria.

AUTOMOTIVE AND STORAGE TECHNOLOGY

Automotive Technology: The Rise of xEVs

The electric vehicle market is poised to gain meaningful adoption over the next several years.

Given increased focus on reduced automotive emission and the rising demand for non-ICE (internal combustion engine) or enhanced fuel efficiency, we believe the broader electric vehicle market is poised to gain meaningful adoption over the next several years. Buoyed by the success of initial vehicles such as Toyota's Prius and the public's increasing willingness to embrace newer technologies, most leading automotive manufacturers are developing automobiles that support some level of electric vehicle technology. Recent advances in energy storage have continued to support rising interest, and thus we consider the electric vehicle market one of the fastest growth submarkets of the overall clean technology sector.

Key Trends

We Expect 45% xEV Market CAGR from 2012 to 2020

EVs = electric vehicles;
HEVs = hybrid EVs;
PHEVs = plug-in HEVs;
xEVs = all three categories

We expect total electric vehicle (xEV) demand to reach 4.8 million units in 2020 globally. However, we do not believe the adoption curve will necessarily grow at a steady rate, primarily because of the impact of product launches, the impact of regulation and policy support, and the outlook for gas prices in various countries.

Initial Momentum Likely in High-End Markets

We believe that for at least the near term, wealthy consumers are likely to remain first adopters of electric vehicles as xEVs, particularly full EVs, will serve as a second vehicle for most. The wealthy are likely to look for innovation and differentiation and are willing to pay a premium for select products. Moreover, if fiscal austerity measures continue, the potential for sustainable purchase subsidies is likely to diminish. In our view, this lends incremental support to our position that the market will be driven by the high-end consumer.

Cost Reductions, Led by Batteries, Should Drive Increased Appeal

A significant portion of an xEV's bill of materials is its battery; lithium-ion batteries today account for 30-50% of the cost of an EV. We expect to see technology costs in the area of batteries decline by around 50% over the next few years, which could substantially reduce the cost of xEVs. In addition, technological enhancements should lead to an improvement in energy density and efficiency, further improving the appeal of electric vehicles, enabling comparable performance to internal combustion engines (ICEs).

Expect Technology Enhancements to Reduce "Range Anxiety"

A major area of concern for electric vehicle users, in particular, relates to "range anxiety," which is concern about the ability of the vehicle to cover longer distances. We believe this concern will diminish for a number of reasons, including initial product launches aimed at second-car, higher-disposable-income families; positive developments from information technology displays, which will significantly reduce anxiety regarding performance; improving "fast charge" capabilities, which will allow 80% battery charges in under an hour, and the growing availability of charging infrastructure along major travel corridors.

Broader Product Launches Likely to Increase Consumer Awareness

The xEV market is no longer relegated to well-to-do environmentalists and early adopters, but is increasingly gaining traction in the mass market through the support of larger original equipment manufacturers (OEMs). We therefore expect broader market awareness to improve. The launch of several high-profile models in the coming years by a broad array of suppliers such as GM (Chevy Spark) and Ford (Focus Electric), as well as the recent launch of the Chevy Volt and Nissan Leaf, should help seed market demand and at the very least help improve the public's understanding of xEV technology.

Key Challenges

Reliance on Government Support

The xEV market is still at the early stages of the adoption curve, and therefore still reliant on various government initiatives in order to drive down the initial EV purchase price. Given increased regulatory scrutiny of various government initiatives on the back of tepid macro activity, subsidies and support for technological development (e.g., batteries) could wane. This could negatively impact the market adoption curve thereby relegating xEVs to a niche market and providing diminished support for necessary ecosystem development (e.g., charging stations, aftermarket sales).

A Tempered Macro Backdrop

Based on price premiums and initial concerns around range anxiety, xEVs are initially targeted toward higher disposable income families seeking a second car. While this market may be somewhat buffered from a weaker macroeconomic backdrop, initial buyers beyond early-stage, wealthy adopters may be discouraged until further cost reductions materialize.

Value a Key Differentiation

In our view, the principle competitors for xEVs are not other xEVs, but the broader automotive industry. Thus, vendors cannot compete on lower TCO or "green" desires alone, but rather on delivering higher total value to the customer. As ICE-based vehicles improve their MPG and reduce carbon emissions, xEV vendors will need to continue to invest in high levels of innovation in order to provide incremental value to the public.

It's Not Just the Car

For xEVs to proliferate, the whole automotive food chain must support their adoption, including parts suppliers, dealers, insurance companies, leasing organizations, repair shops, and so on. We believe mass adoption could be stalled until enough time has passed for certain questions to be answered (i.e., actual battery life, residual value, leasing structure) in order to drive the necessary growth in the ecosystem for EVs.

The xEV Market is Growing. What's in the Pipeline?

Many leading auto manufacturers are beginning to "go electric."

As mentioned above, most leading automotive manufacturers are now developing automobiles that support some level of electric vehicle technology. Figure 19 shows companies' announced production plans for 2012-14. The important takeaway is that electric vehicles are becoming increasingly more affordable as manufacturers are developing EVs to not only compete with other EVs, but also compete in the broader automotive market as an alternative to gas-powered cars.

Figure 19: Announced Production Plans (Plug-Ins and Complete EVs) for 2012-14

Manufacturer	Model	Production and Data	Battery Manufacturer	Launch	Price	Electric Range per charge	Drivetrain
BMW	ActiveE	few hundred-1,000	JCI	2011	TBA	100 miles	EV
Coda Automotive	Coda Electric Sedan	20,000 in 2011	Lishen Power Battery (60%)/CODA (40%)	2011	$44,900	90-120 miles	EV
Daimler	Smart ForTwo Electric - second generation	>2,000 vehicles	Tesla	2008		70 miles	EV
Daimler	Smart ForTwo Electric - third generation	10,000 production volume in 2013	Deutsche Accumotive	Reservations beginning Q411; Launched in Spring 2012	$28,752	87 miles	EV
Fisker	Karma	15,000; 40% in US; 50,000 in 2013; 85,000 in 2014	A123 Systems	End of 2011	$95.900 for basic model; $109,850 for top model	50 miles	PHEV
Fisker	Nina	75,000 - 100,000 by 2014	A123 Systems	Mid 2013	between $50,000-$80,000	TBA	PHEV
Ford	C-Max - Energi and Hybrid	TBA	JCI	Fall 2012	TBA	Unspecified; likely similar to Chevy Volt	PHEV
Ford	Focus electric	18,000 in 2012; 21,000 in 2013	LG Chem, JCI, MAGNA, E-Car Systems, Toshiba, Sanyo	Late 2011	$30,000	100 miles	EV
Ford	Transit Connect Electric	1,000 vehicles per year in first few years	JCI	2010	$57,400	80 miles	EV
GM	Chevy Volt	60,000 in 2012; 67,000 in 2013; 120,000 in 2014	LG Chem, JCI	On sale since Dec 2010	starting at $40,280 (2012 base price will be $1,005 less than 2011 model)	25-50 miles	PHEV
GM	Cadillac ELR	may only sell 2,000 a year	LG Chem	Unveiled at 2009 Detroit Auto Show, Will go into production in 2013 as a 2014 model	2014	TBA	PHEV
GM	Chevy Spark	TBA	A123 Systems	Sold in limited quantities in select US and global markets starting 2013	TBA; likely less expensive than Chevy volt	TBA; likely slightly higher than Chevy Volt	EV
Honda	Fit EV	TBA	TBA	2012	TBA	100 miles	EV
Mitsubishi	MiEV	40,000 in 2012; 5% in 2015; 20% in 2020	GS Yuasa Corporation, Lithium Energy Japan, Toshiba	First launched in Japan in July 2009; Released for wide public April, 2010	$43,000	100 miles	EV
Mitsubishi	i	TBA	GS Yuasa, Mitsubishi Corporation and Mitsubishi Motors	2012	$29,125	85 miles	EV

Source: Company Press Releases, IEA

Figure 20: Announced Production Plans (Plug-Ins and Complete EVs) for 2012-14 (Continued)

Nissan	Leaf	24,000 in 2011 in Japan; 35,000 in 2012; 54,000 in 2013; 200,000 in 2014	AESC	Deliveries began in US and Japan in 2010	$32,780	100 miles	EV
Renault	Fluence Z.E.	20,000-40,000 units initial production	Better Place battery exchange system	late 2011	$36,015	100 miles	EV
Renault	Zoe	250,000 in 2013	AESC, LG Chem, SB Limotive (SBL)	2012	Expected to be around $20,000	62 miles	EV
Renault	DeZir	TBA	TBA	TBA	TBA	100 miles	EV
Tesla	Roadster	2,500 units by 2012 (end of production)	Panasonic Energy Company	Started selling in 2008	$109,000	245 miles	EV
Tesla	Model S	5,000 in 2012; 20,000 in 2013	Panasonic Energy Company	Mid 2012	Starting at $57,400	57,400 - 160 miles per charge; 67,400 - 230 miles per charge	EV
Tesla	Model X	10,000-15,000/year	TBA	Late 2013	Starting at $49,900	TBA	EV
Tesla	Gen III	100,000 + units/year	TBA	2015	Starting at $30,000	TBA	EV
Think	City	10,000 in 2013; 20,000 in 2014	A123 Systems, Ener1, FZ Sonick	2010 Left hand drive only; Right hand drive in 2013	$21,990	115 miles	EV
Toyota	Prius Plug-in	16,000 in 2012	Prime Earth EV Energy (80.5% Toyota, 19.5% Panasonic)	Released in 2000	starting at $32000	49 miles	PHEV
Toyota	RAV 4EV (second generation)	TBA	Tesla	Expect to be mass produced by 2012; Initially limited to CA only	TBA	roughly 100 miles	EV
Toyota	Prius V	TBA	Primeearth EV Energy Co.	Fall 2011	starting at 26,400	44 miles	EV
Toyota	Prius C	TBA	Primeearth EV Energy Co.	Spring 2012	Not yet released, likely no more than $20K	> 51 miles (estimate)	EV
Toyota	3rd Gen Prius	15,000 first year output	Primeearth EV Energy Co.	2012	Starting at $23,520	13 miles	PHEV
Toyota	FT-EV	TBA	TBA	TBA	TBA	50-90 miles	EV
Toyota	FT-EV II	TBA	TBA	TBA	TBA	56 miles	EV
VW AG- Audi	Q5 Hybrid Quattro	TBA	Sanyo	Late 2011	TBA	Less than 2 miles	Hybrid
VW AG- Audi	A1 e-tron	TBA	TBA	Launch field test in Munich in 2011	TBA	31-62 miles	PHEV
VW AG- Audi	e-tron	100,000 by 2020	Sanyo	2012	$160,000 (estimate)	154 miles	EV
VW AG- Audi	e-tron Spyder	TBA	TBA	TBA	TBA	31 miles	PHEV
VW	E-Up	TBA	TBA	2013	TBA	80 miles	EV
VW	E-Golf	TBA	TBA	2014	TBA	93 miles	EV

Source: Company Press Releases, IEA

Definition of the Electric Vehicle (xEV) Market

For electric vehicles, we refer to all the technologies that employ some sort of electrification compared to traditional internal combustion engine technology.

- **Internal Combustion Engine** (ICE): The dominant technology used in the automotive industry. Fuel is injected into a combustion chamber. It is then ignited to supply power to both the drivetrain and the engine.
- **Hybrid Vehicles** (HEVs): Use an electric motor and an ICE. The electric motor is powered from a battery pack that is charged through regenerative braking and/or the ICE. Hybrids can offer power acceleration (mild hybrids) or can have an electric launch operation. Hybrid vehicles do not recharge through the electric grid. Typical energy capacity is around 1-2kWh.
- **Plug-in hybrid** (PHEV) **and Full Electric Vehicles** (EVs): The plug-in hybrids have a similar layout as hybrids (combinations of electric motor and ICE), but the battery can be charged by electricity from the electric grid. Their battery capacity is 5-15kWh. Full electric vehicles are powered solely by the rechargeable battery pack. The battery size is the largest among all other EV types with current capacity ranging from around 25-90kWh.

The emissions reduction for HEVs and EVs stems from reduced gas consumption. Emissions reduction driven by PEVs varies by location, as each region has a different fuel mix for electricity production.

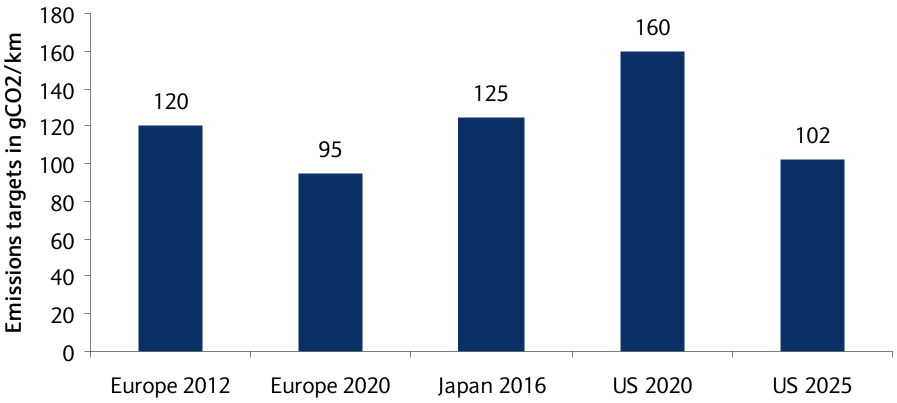
In our view, the market penetration of the electric and plug-in hybrid vehicles depends on: 1) the cost of the energy storage, 2) vehicle maximum range, 3) financial incentives provided by local governments, 4) consumer preferences, 5) recharging time of the vehicle (if any), 6) availability of charging stations, 7) the cost of electricity, and finally, 8) the cost of gas.

Tighter Emissions Regulation Driving Technological Advancement

The combination of regulatory criteria and competition has spurred increased investment in EV technologies.

Over the past few years, major car markets are being regulated in an increasingly strict fashion. These government initiatives are compelling car manufacturers to innovate in order to meet the updated emissions criteria. While electrification of the automotive fleet seems the most near-term solution, enhancements in ICE technology have enough potential to meet many near-term requirements. Already, most of the major automakers are close to meeting their 2012 standards through ICE-related techniques (e.g., engine downsizing, transmission optimization, aerodynamic optimization). However, increased reduction beyond near-term targets is harder to achieve based on the current incumbent technology. This creates an opportunity for the xEV market with a range of products that can assist in reducing emissions, either by offering some sort of electrification or by fully replacing the ICE.

Figure 21: Regulation and Current Auto Manufacturers Emissions



Source: Barclays Capital, Industry data

xEVs are Increasingly Becoming Cost Competitive

Next year and 2013 are likely to be pivotal years for the xEV market given the number of high-profile launches expected to take place.

We employ a Total Cost of Ownership (TCO) model to evaluate the cost competitiveness of EVs with and without incentives in China, the United States, and Japan. For an accurate estimate, we use the local car usage patterns and prices. We summarize our findings:

Japan: The Japanese market is well suited for hybrid and plug-in hybrid vehicles. The lack of incentives and the high purchase price of complete EVs, however, may not be as supportive for mainstream market penetration. Hybrids and PHEVs seem to have a comparably higher cost advantage compared to ICE cars within the market, due to the high gas price.

China: The Chinese market is an attractive one for EVs; however, due to the low purchase price of conventional ICE cars, Chinese consumers may not be willing to pay the high upfront cost required for an EV. While five years is enough to break even with an ICE car, the benefit is not yet substantial. Therefore, unless a material reduction in price points take place, we believe the Chinese market is less suitable for broad-based xEV adoption.

United States: In the U.S. market, the combination of incentives, increasing gas prices, and high average mileage per year result in an ideal environment for the development of all types of EVs. However, until improved price points emerge, we continue to believe the market will remain focused on high-discretionary-income, second-car consumers.

Next year and 2013 are likely to be pivotal years for the xEV market. Several major car makers are launching a variety of new xEVs (approximately 20 new models will enter the market in the following three years from both incumbent OEMs as well as start-ups).

We base our predictions about the xEV market on:

- Announced Production Plans,
- Total Cost of Ownership,
- Industry Forecasts, and
- National Targets for Three Different Markets.

Total Cost of Ownership

TCO is one key element in determining the value an xEV can provide.

TCO is a useful metric to evaluate the market acceptance of EVs and examine the effect of the different variables that affect cost. TCO can also serve as a platform to compute the years required for an xEV to break even compared to an ICE vehicle.

The total cost of ownership is computed as follows:

Total Cost of Ownership = Purchase Cost – Incentives + Cost of fuel – Residual Value

Maintenance costs (despite being potentially lower for the complete EV due to fewer moving parts) are not included since they are case specific and the data available for EVs are not adequate. We recognize, however, that as the market evolves, maintenance costs are likely to be an issue, particularly with respect to battery replacements.

Our analysis is based on a series of assumptions that relate to: 1) average mileage per year, 2) total years of ownership, 3) cost of gas, 4) cost of electricity, 5) residual value of the vehicle at the end of the ownership, 6) fuel consumption of the vehicles and the electricity consumption per distance travelled by plugged-in EVs, 7) financial incentives given by each government, and finally, 8) the cost of the baseline ICE vehicle. The assumptions are summarized below for the U.S., Japanese, and Chinese markets.

Figure 22: Assumptions per Country for Total Cost of Ownership Model

	USA	Japan	China
Baseline car price ($)	EV $14380 Plug In $18000 Hybrid $19000	EV $18000 Plug In $26000 Hybrid $21800	EV $11000 Plug In $11000 Hybrid $11000
Mileage per year	15000	5000	11500
Total years of ownership	5	7.5	5
Cost of electricity ($/kWh)	0.112	0.29	0.063
Cost of gas ($/gal)	3.5	8.0	3.8
Residual value of ICE vehicle*	40%	25%	40%
Residual value of hybrid/EV *	30%	10%	30%
MPG plug-in hybrid	60	60	60
MPG hybrid	50	50	50
MPG ICE	28	28	28
kWh/mile EV	0.34	0.34	0.34
kWh/mile Plug-In	0.36	0.36	0.36
TCO Hybrid ($)	**$21,000**	**$30,825**	**$32,202**
TCO Plug-in Hybrid ($)	**$24,367**	**$32,943**	**$23,734**
TCO Full EV ($)	**$18,302**	**$31,920**	**$15,360**

Source: US Environmental Protection Agency (EPA), International Energy Agency (IEA), current market data, car manufacturers' websites
* Percent of initial price

The baseline car assumptions depend on the market. For the U.S. market, given the high incentives for complete EVs and plug-ins, we compare them with low cost competitors such as the Nissan Leaf vs. Nissan Versa and the GM Volt vs. Chevrolet Cruze. The hybrid market is compared with equivalent upscale class vehicles such as the Toyota Prius vs. VW Golf/Toyota Corolla.

Given its size, we select the same vehicle price for all EV segments in the Chinese market ($11,000) due to the fact that more than 40% of the cars sold there do not exceed that price tag. As such, the hybrid vehicle segment, which lacks incentives, is possibly underestimated due to its price premium. However, we conclude that the other two market segments are highly attractive. Due to the lack of official data for car prices outside the United States, we show results of our model for the U.S. market and the Chinese market when applicable. However, using indicative car prices for the rest of the markets and EVs, we derive important conclusions concerning the market penetration of EVs.

Different xEVs Cost Competitive in Different Countries

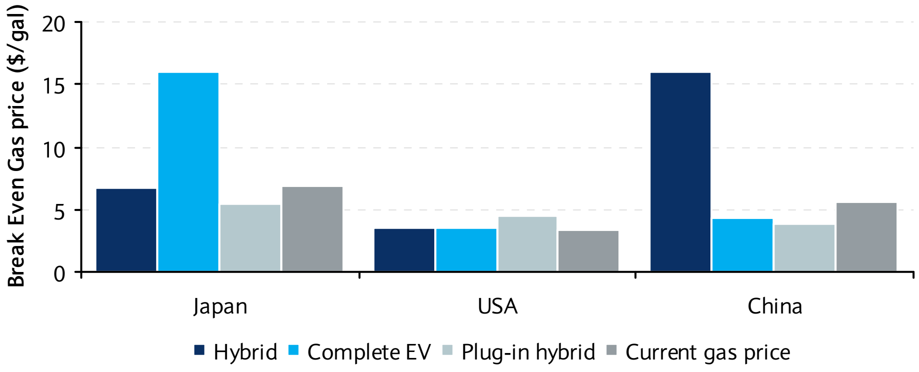
Fluctuations in gas prices – particularly by region – serves as a key variable in determining the TCO value of an xEV in any given market.

We summarize our findings in Figure 23, which shows the breakeven gas price between an ICE vehicle and EVs. The different usage of the car in each country and the different gas price affect the competitiveness of the different EVs.

In Japan, Hybrids and Plug-in hybrids have a lower TCO than ICE cars, but Full EVs are twice as expensive as an ICE car. In China, Plug-In hybrids and Full EVs have almost the same TCO as ICE cars, but hybrids appear too expensive. Finally, in the United States all EV segments have a TCO which is almost the same as ICE vehicles.

Taking into account the extra incentives that are offered in some states of the US and some provinces of China, Full EVs and Plug-in hybrids become even more attractive.

Figure 23: Breakeven Gas Price for Japan, US, and China



Source: Barclays Capital

Dependence on TCO Likely Varies by Market

The dependence on TCO as the principle driver in a purchasing decision is likely to vary by end market. On the consumer front, a savings of a couple thousand dollars a year is unlikely to convince a consumer to purchase an xEV — particularly if it is priced at an initial premium — unless the car provides at least a comparable feature set and value proposition relative to others in its class. In the case of fleet replacements, we believe TCO considerations are likely to weigh more heavily on whether to utilize xEVs given: 1) defined driving routes, 2) improved efficiency, and 3) lower maintenance costs (due to stop/go driving patterns).

We Recognize it's Not Just about TCO, but Total Value

In our view, adoption is not just about TCO, but the total value provided to the end user including performance vs. traditional ICE models.

A TCO calculation is just one component of market adoption. Certainly, the math has to work in providing the consumer with some level of comfort that increased electrification should reduce overall cost of gas, but the cost benefit is only part of the equation. In our view, the decision to purchase an xEV is about the full "value" of the automobile to the end user. In other words, competition for an xEV is not another electrified car, but more than likely another ICE vehicle. For example, a consumer that is considering Tesla's S-series sedan is unlikely to consider a Toyota Prius, but rather is likely considering a comparably priced Mercedes, BMW, or Audi. Performance and innovation are thus likely to be high on the list of priorities when considering an xEV. In our view, the pressure will remain on xEV manufacturers to deliver a competitive option on not only a cost or performance basis, but more importantly on a total value basis.

Demand forecast: Industry Expects CAGR 45% for 2012-20

We estimate a 45% CAGR for the xEV market between 2012 and 2020.

We expect total xEV demand (EVs, HEVs, PHEVs) to reach 4.8 million units in 2020 globally. However, we do not believe the adoption curve will necessarily grow at a steady rate, primarily because of the impact of product launches, regulation and policy support, and the outlook for gas prices in various countries.

- The national targets are unlikely to be achieved under the current production plans, total cost of ownership and financial incentives. In the Chinese market, for example, despite the government's ambitious plans, sales are expected to reach only around 500,000 EVs per year by 2020.
- We believe the U.S. market could emerge as one of the leading markets for xEVs by 2020 but will be highly dependent on continued support of government subsidies to drive lower initial price points and support initiatives to lower the total cost of development.
- We forecast Europe to become a popular EV market by 2020, reaching 1.7 million EVs per year. However, the electrification process will likely be delayed until 2014-15, because: 1) most of the European automakers are expanding their product portfolio with advanced ICE low emission vehicles, and 2) uncertainties persist about the financial situation and government policy in many of the European markets.
- The Japanese market will continue growth in hybrids and plug-in hybrids (close to 800,000 plug-ins per year by 2020), but will not be an attractive market for full EVs, with around 70,000 Full EVs per year.
- While in the long term a supply shortage is predicted, in the short term there might be an over-supply of EVs during 2012-14, higher than the sales forecast expectations of industry experts. Therefore, we see a risk of a production push-back by OEMs during that period as well as the potential for over-capacity in the battery market.

We outline below a summary of the sales projection by year and market.

Figure 24: Total xEV Cars Sales Projection by Country and Year

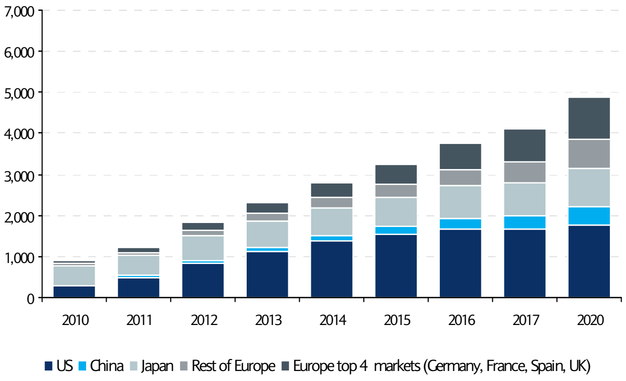
Total xEV	2011E	2012E	2013E	2014E	2015E	2016E	2017E	2020E
US	496,467	843,418	1,121,594	1,373,033	1,554,484	1,673,953	1,683,451	1,780,737
China	33,635	66,356	101,669	142,551	194,265	267,442	299,288	430,009
Japan	487,724	593,367	641,637	661,136	695,523	774,221	800,899	942,041
Europe Top 4	122,471	188,168	277,238	378,606	476,158	617,675	791,936	1,031,896
Rest of Europe	81,648	125,445	178,293	241,088	298,298	385,913	491,000	620,504
Total	**1,221,945**	**1,816,754**	**2,320,431**	**2,796,414**	**3,218,728**	**3,719,204**	**4,066,573**	**4,805,187**

Europe Top 4 represents Germany, France, Spain, and UK
Source: Barclays Capital, JD Power, company press releases, IEA.

Global Market Demand

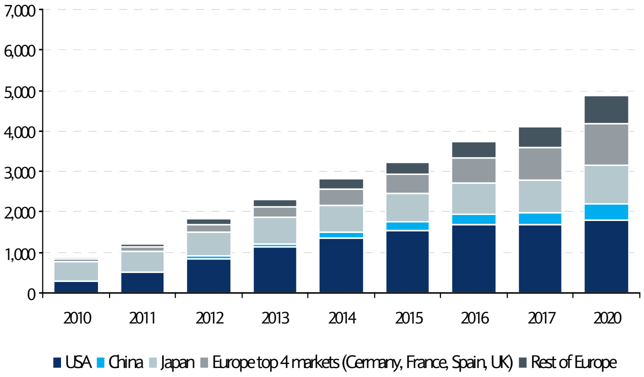
Penetration rates for xEVs are still at relatively low levels representing only 1.3% of total vehicle shipments in 2010. As rising adoption will be dependent on numerous supply-side (e.g., product availability, price points, component costs) and demand-side (e.g., incentives, comfort around new technologies, broader consumer sentiment) factors, we recognize that projecting market forecasts to any degree of certainty is a highly challenging task. Based on our analysis, there is a high degree of variation between market estimates (in our case those provided by JD Power), government targets, and other industry sources.

Figure 25: Plug-Ins and Complete EVs National Growth Target



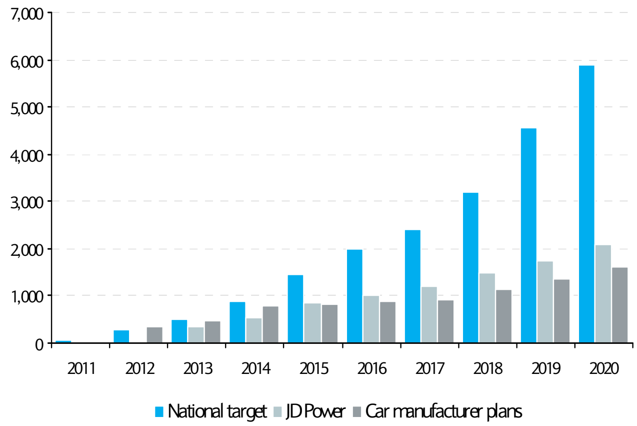
Source: JD Power, International Energy Agency (IEA), Barclays Capital

Figure 26: Hybrids – Plug-Ins and Complete EVs Sales Forecast



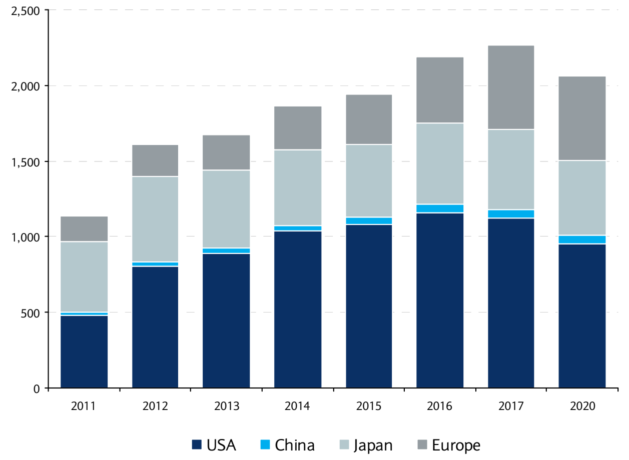
Source: JD Power

Figure 27: Production Plans vs. National Targets for PHEVs



Source: JD Power, IEA, Barclays Capital

Figure 28: Global Sales Growth of Hybrid Vehicles



Source: JD Power, Auto-manufacturers press releases, Barclays Capital

However, given certain regional dynamics, we believe the following trends are likely characteristics of the major markets over the next few years.

The US has the Potential for Healthy Growth in all EV Segments

The US is one of the best positioned regions for rising adoption of xEVs.

In line with our TCO analysis, plug-in hybrids and full EVs are expected to experience strong growth until the incentives from the U.S. government expire (200,000 vehicles). According to the manufacturing plans of the leading automotive companies, this is expected to happen sometime toward the end of 2013, reaching 1.5 million EVs per year in 2015 and 1.8 million in 2020. The continuing growth of plug-in EVs remains linked to the state financial incentives policy.

European Demand Will Be Weak Initially but Likely Catch up by 2020

European demand is likely to remain tempered for the near-term, though we expect the region to catch up as we approach the back half of the decade.

European automakers are focused on ICE improving technologies, such as the popular diesel technology that meets current emissions requirements. As such, EVs are not as popular as in other markets. However, given the incentive policies followed by most of the European countries and the increasingly strict emissions thresholds, EVs are expected to grow significantly during the next decade, reaching 800,000 in 2015, 1.7mn in 2020.

Japanese Demand Not High for Complete EVs

The 10% market share of hybrid vehicles in Japan is the world's highest, and demonstrates their popularity. Industry experts expect the same trend to continue with 700,000 HEVs in 2015 and 940,000 HEVs in 2020. Complete EVs are not expected to enjoy similar, strong growth, which is in line with our TCO analysis.

Figure 29: National EV Penetration Targets

Country	Target (expressed in units or in market share)	Announcement Date	Source
Australia	2018: mass adoption 2050: 65% stock	6/2009	Project Better Place Energy White Paper
Australia	2020: 20% production	6/2009	Mitsubishi Australia
Canada	2018: 500,000 2020: 18,000 (sales in Ontario)	6/2008 6/2009	Government of Canada Canadian EV Technology Roadmap
China	5,000,000 EVs	3/2011	EVI (Electric Vehicle Initiative)
China	540,000 by 2015	7/2009	Pike Research
China	2008: 21,000,000 electric bike sales	4/2009	The Economist
China	2020: 7-9% EVs, 4-6% hybrid EVs (5,000,000 EVs)	7/2011	Boston Consulting Group
China	2030:20 – 30% market share	10/2008	McKinsey & Co.
Denmark	2020: 200,000 2020: 50,000		ENS Denmark EVI
France	2020: 2,000,000	3/2011	EVI
Germany	2020: 1,000,000	3/2011	EVI
Ireland	2020:230,000 2030: 40% market share	10/2009	Electricity Supply Board (ESB)
Israel	2011: 40,000 EVs 2012: 40,000 to 100,000 EVs annually	9/2008	Project Better Place
Japan	2020: 20% market share (around 800,000 based on IEA)	3/2011	EVI
Netherlands	2015: 5% market share 2040: 60% market share	9/2007	Dutch Energy Agency
New Zealand	2020: 5% market share 2040: 60% market share	10/2007	Prime Minister Helen Clark
Spain	2020: 2,500,000	3/2011	EVI
Sweden	2020: 600,000	3/2011	EVI
Switzerland	2020: 145,000	7/2009	Alpiq Consulting
UK	2020: 1,200,000 EVs, 350,000 PHEVs 2030: 3,300,000 EVs, 7,900,000 PHEVs	10/2008	Department for Transport
USA	2015: 1,000,000 PHEV	1/2009	President Barack Obama
Worldwide	2030: 5 – 10% market share	6/2008	McKinsey & Co.
Worldwide	2020: 10% market share	6/2009	Carlos Ghosn, President of Renault
Europe	2015: 480,000 EVs	5/2009	Frost & Sullivan
Nordic countries	2020: 1,300,000	5/2009	Nordic Energy Perspectives

Source: IEA, Barclays Capital and listed sources

Initial Adoption – "Plus One" Car Among Wealthy

We expect initial adoption to be driven by wealthy consumers that can afford a "plus one" car.

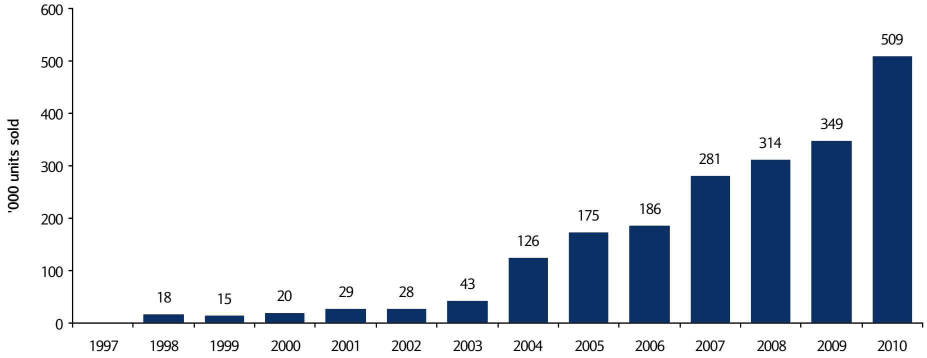
While technological improvements are likely to reduce inherent concerns of the general public (e.g., range anxiety), initial adoption is likely to be among those that desire innovation over cost and have the ability to afford more than one car. In other words, consumers that don't have to worry about range anxiety and can afford an alternative means of transportation in the event it is needed are likely to be early adopters of EVs.

A number of data points from the field support our view. Tesla has already sold out its 2012 production plans (approximately 5,000 units) for the Model S sedan which is available at a targeted retail starting price of $49,900 (post subsidy, and dependent on battery pack size). According to Nissan's updated data regarding their 4,000-plus Leaf owners, the average Leaf buyer drives less than 60 miles per day; the Toyota Prius is the number one vehicle owned by Leaf buyers (19% with a Prius in the garage) supporting the "plus one" car argument; and less surprisingly, Leaf buyers were college educated with an average credit score of 750 and a combined household income of $140,000. We also know that even in this volatile economic environment luxury car sales are continuing to surge; luxury companies such as BMW AG, Daimler AG, and Volkswagen AG's Audi brand have all seen robust sales volumes and appear on track to continue solid growth.

Premiums Likely to Replicate Prius's Success in Capturing the Mindset of the Wealthy

Building on our premium case for EVs we look into the success of Toyota's Prius and the positive momentum that Tesla is building. We believe these manufacturers managed to capitalize on the wealthy's desire to innovate, and be seen as different and environmentally conscious. The Prius has grown by a CAGR of 70% since its introduction in 1997, selling more than 2 million units worldwide. We believe a majority of its sales went to wealthy, prestige-seeking individuals, in the absence of a premium alternative. With the given demand characteristics for electric vehicles and the potential consumer profile that we've identified, premium makers are likely to capture the mindset of the wealthy and follow the success of Toyota and Tesla as soon as they manage to launch their EV product to the market.

Figure 30: Toyota's Prius Captured Environmentally-Conscious, Wealthy Buyers, in the Absence of a Premium Alternative



Source: Toyota Motor Corporation Data

STORAGE TECHNOLOGY: A KEY COMPONENT OF xEVS

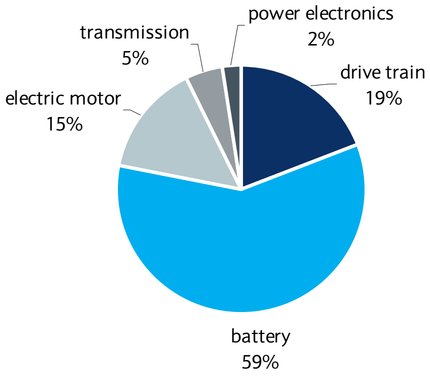
The common factor for all modifications of EVs is the storage of energy and the energy conversion from electrical (battery) to mechanical (wheels). The electric motor has already reached high conversion efficiency. Thus the burden is transferred to developing energy storage systems, which are able to reliably and safely deliver the required power at minimal time and cost.

More than half an EV's cost is in its battery, making battery technology and innovation key to driving lower-priced models — critical to supporting adoption.

Examining the cost breakdown of a full electric car, more than half of the vehicle's cost is in its battery. Energy storage has been a research issue for the past decades with major advances both in energy density and cost of storage. While the cost of storage for electric vehicles is still high enough to impose a significant premium compared to ICE vehicles, we believe that over the next few years, the energy density (i.e., kWh/kg, range of EV) and the subsequent storage cost ($/kWh) will be reduced by approximately half.

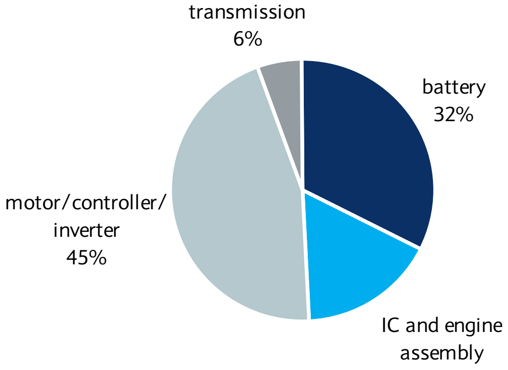
The cost of a hybrid electric vehicle is differentiated from an electric vehicle in that the size of the battery is substantially smaller (Toyota Prius capacity is roughly 2kWh). However, there is the additional cost of the ICE. As the chart below illustrates, the motor/controller/inverter assembly of a hybrid vehicle is the most cost-intensive component.

Figure 31: Cost Breakdown of Electric Vehicle



Source: Barclays Capital

Figure 32: Cost Breakdown of Powertrain of a Hybrid Vehicle



Source: University California Berkeley, UC Davis

Batteries for EVs

Batteries are the most cost-intensive part of an EV. Their cost and ability to store energy will determine the viability of EVs. Key points:

- Lithium-Ion batteries are the next generation batteries that will equip the majority of EVs.
- The current cost of batteries is around $650-750/kWh, but through an increase of volume production, the industry expects at least a 30-40% cost decrease by 2014.
- Polymer electrolytes are the next commercial advancement that should allow thinner batteries to further reduce costs.

Figure 33: Established Battery Technologies

Battery Type	Year of commercialization	Features	Environmental Impact
Lead- acid	1910	Poor energy density, moderate power density, low cost	Lead toxic, but recyclable up to 95%
Zinc – air	1932	Low - Medium energy density, high power density	Zinc smelting not eco-friendly
Ni-MH	1989	Moderate energy density, high power density	Nickel not eco-friendly, toxic and rare. Recyclable
Lithium-ion	1991	High energy density, high power density, high cycle life, high cost	Different combination, different impact. Cobalt very popular, but rare. Iron and Manganese possible alternatives and eco-friendly. Lithium relatively green. Recyclable

Source: Nature Publication, Building Better Batteries. Armand et al.

EVs have specific requirements imposed on their batteries. These characteristics are vital to their performance and reputation:

- Power density (W/kg) that affects the acceleration of the vehicle
- Energy density (Wh/kg) that affects the range of the vehicle
- Recharging time required to charge the battery
- Reliability of the battery for at least 10 years
- Safety
- Storage deregulation
- Robustness of the battery that is required to operate at a large range of different climates and temperatures
- Environmental impact
- Recycling

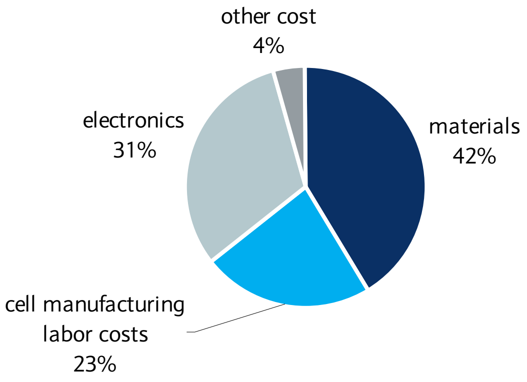
There is an inherent trade-off between power density and energy density for all batteries. Power density is in general considered a solved problem for all types of EVs. However, battery manufacturers still work on the rest of the issues which have equal importance for the competitiveness of EVs. Several battery technologies exist to date, each one at different level of development. The prior table shows a short summary of the established, mature technologies commercially available today and the environmental impact of each technology. So far, Nickel Metal Hydride (Ni-MH) batteries have been popular for hybrid vehicles; however, lithium-ion is nowadays the major technology researched due to its high energy and high power density that appears to have the potential for establishing EVs.

Lithium-Ion Batteries Likely to Remain Primary xEV Storage Technology

The advent of lithium-ion batteries served as a game changer in providing lower cost technologies for the development of more cost-competitive EVs.

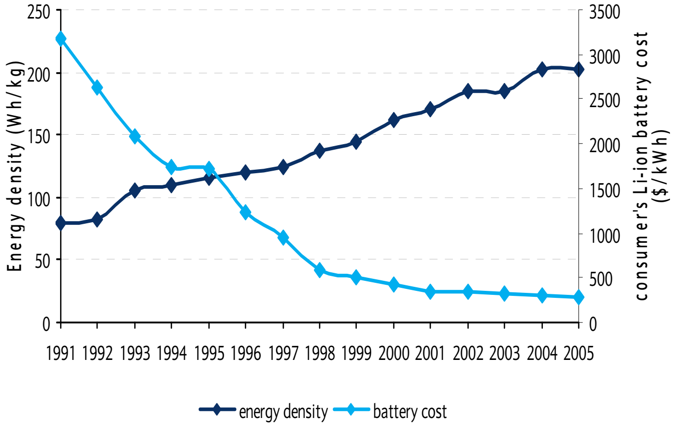
Sales of lithium-ion batteries for EVs only began in 2009, but we can draw some conclusions by observing the evolution of lithium-ion cost and energy density of consumer electronics batteries. The prices per unit energy stored between 1991 and 2005 have dropped by roughly 80% (see Figure 35). The steep cost reduction since its commercial introduction is due to production volume increase in Asia, technology reduction, and better space utilization within the battery. At the same time, the energy density has increased 2.5 times, which translates into smaller batteries. While the safety regulations compared to EV batteries are less stringent and the power management electronics required are less sophisticated, their fundamental operation remains the same. One of the key differences between batteries for consumer electronics and vehicles is the power management software and the cooling that is required for reliable and safe operation. It is estimated that the electronics of the battery account for approximately 30% of the total battery cost. Approximately 40% of the total cost is the cost of the materials in the battery cell. The cost breakdown of batteries is shown in the following chart (excluding gross margin).

Figure 34: Cost Breakdown of Lithium-Ion Batteries



Source: Center on Globalization Governance & Competitiveness

Figure 35: Lithium Batteries for Consumer Electronics Historical Prices and Energy Density



Source: Historical Data, Duke University

Lithium-Ion Batteries Value Chain

The basic component of a lithium battery is its cell. After the cells are produced they are combined in optimal arrangements to form a module. Finally, the modules together with electronics and cooling systems form the battery. A summary of the supply chain of lithium-ion batteries is outlined below (Figure 36).

Figure 36: EV Battery Value Chain

Components	Cells	Module	Battery pack
Anode and cathode active materials, binder, electrolyte and separators. Some technologies require rare earth materials	Production and assembly of single battery cells Research is focused on different cathode chemistries that can lower the cost	Cell configuration into modules, including electronic management	Modules installation with power, cooling and safety management systems. Battery installed in vehicle for 8-10 years usage.
20% of total battery cost	**45% of total battery cost**	**30% of total battery cost**	**5% of total battery cost**

Source: Barclays Capital

The cell is composed of four basic structures: cathode, anode, electrolyte and separator. While anodes have high specific capacities, cathodes exhibit much lower capacities: to remedy this, the industry is attempting to develop the appropriate chemistry to boost performance. The dominant chemistries for consumer electronics contain cobalt; however, due to the scarcity of the material and its safety issues, manufacturers are shifting to different technologies. The major technologies today are:

- LMO (lithium manganese oxide) is the most popular solution for EVs with medium energy density (roughly 150 Wh/kg), low cost, high power density , but lower expected lifetime.
- LCO (lithium cobalt oxide) used to be the solution for consumer electronics, due to the highest energy density (theoretical energy density for LMO is 570 Wh/kg). However, the safety issues related to cobalt, its scarcity and the consequent price increase of cobalt have shifted many of the battery makers into other technologies.
- LFP (lithium iron phosphate) has lower energy density but lower materials cost, higher lifetime and increased safety. Furthermore, it is viewed as a substitute to the leading cobalt technologies.
- NCA (nickel cobalt aluminium) (roughly 160 Wh/Kg) exhibits high energy density, but is thermally unstable.
- NMC (nickel manganese cobalt) is extensively researched due to its high energy density (high conductivity), but it suffers from the same issues as cobalt.
- Lithium-ion nanophosphate where the cathode consists of nanophosphate materials. As a result, the surface area of the cathode is increased with increased conductivity and faster charging times.

Anodes are less difficult, because of the high energy density that has been achieved. Anodes are usually made from graphite. Recent advances have developed novel anode technologies that replace the graphite with lithium titanate oxide. As a result, the recharging time is reduced materially.

Electrolytes of lithium-ion batteries are a focus of development and the two types that are being developed are:

- A mixture of lithium salt and organic solvent, which is the current dominant technology
- Polymer electrolyte, that allows thinner batteries, flexibility in the shape of the battery and potential reduction of the cost due to the inexpensive polymers

The lithium-polymer technology was first introduced in 1999 and is a popular and growing technology for consumer electronics (Apple recently introduced lithium-polymer batteries for its laptops, allowing the fabrication of ultra-thin portable devices). Following the general trend in battery technology, we expect this to be introduced into EVs in the coming years. NiMH batteries entered the consumer electronics market in 1989 and the car industry in 1996 (GM EV1, followed by Prius in 1997). Following a similar trend, lithium-polymer batteries were commercially introduced a few years ago (around 2007) and we expect the next generation of lithium-ion batteries for EVs to utilize this technology.

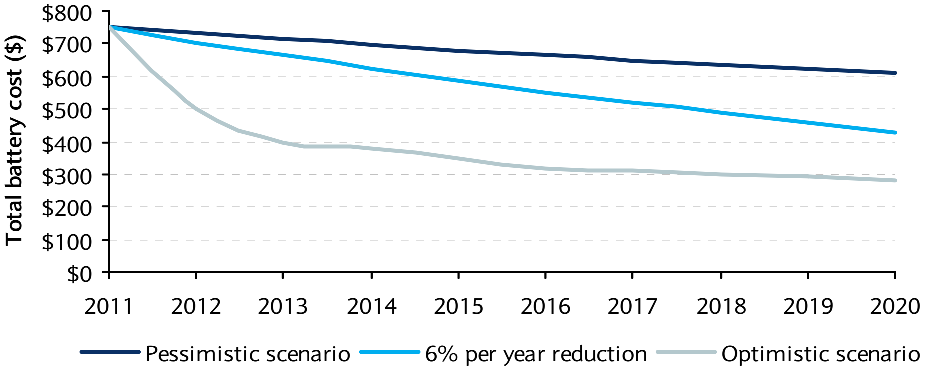
The final component of the cell is the separator that does not allow any contact between the anode and the cathode. Furthermore, it acts as a safety mechanism in case of overheating.

Cost of Batteries Remain High, but Should Decrease Materially

We look for a 50% reduction in battery cost to emerge over the next several years, helping to drive lower pricing for various EVs.

The current cost of energy storage for Li-ion batteries suitable for electric vehicles is in the order of $650-750/kWh and the capacity needed depending on the application spans from 1kWh for a mild hybrid application to around 30-90kWh for a full electric vehicle. The battery industry expects this figure to drop over the next few years to $400-500/kWh at the battery cell level due to volume increase (see chart below). According to A123 Systems, an independent supplier of batteries to the xEV market, the company expects to be able to reduce its own cell costs by 50% by 4Q12 largely driven by scale manufacturing improvements and lower input costs. It will be higher at the battery level due to the cooling and the electronics that are required. Even at this cost, however, ICE vehicles still carry a cost advantage.

Figure 37: Battery Cost Projection



Source: Barclays Capital, Duke University

There are two ways the battery cost can be decreased: 1) through increase of the energy density of the battery which results in a decrease of the total mass of materials required, and 2) through manufacturing improvements and volume production increases which result in a cost reduction.

Given the battery cost breakdown, we have generated three scenarios about the cost of lithium batteries over the next few years. Starting with the industry notion that batteries exhibit a 6% yearly decrease in cost, we calculate two possible scenarios. In an optimistic scenario, given the increased research funds allocated by governments over the last years and the targeted efforts by battery manufacturers to reduce cost, we expect the unit battery cost to decrease as manufacturing capacity increases. In an extreme scenario, we assume a sudden drop in the labor cost and a 10% per year decrease to materials cost and power electronics cost due to manufacturing increases and research developments. In a pessimistic scenario we assume steady labor costs and 5% yearly decrease in materials and electronics cost. The graph above shows the outcome of each scenario.

Key Considerations

Our forecasts rely on implied assumptions concerning the government's support of EVs, range anxiety, recycling of the batteries, and the charging infrastructure.

Governments in the US, China, and Europe are adopting ambitious incentive programs to bolster the growth of EVs.

Governments Broadly Support the Development of EVs – for Now

Financial incentives are strong in certain major markets such as China and the United States. This should bolster growth and increase public acceptance of EVs. Some observations:

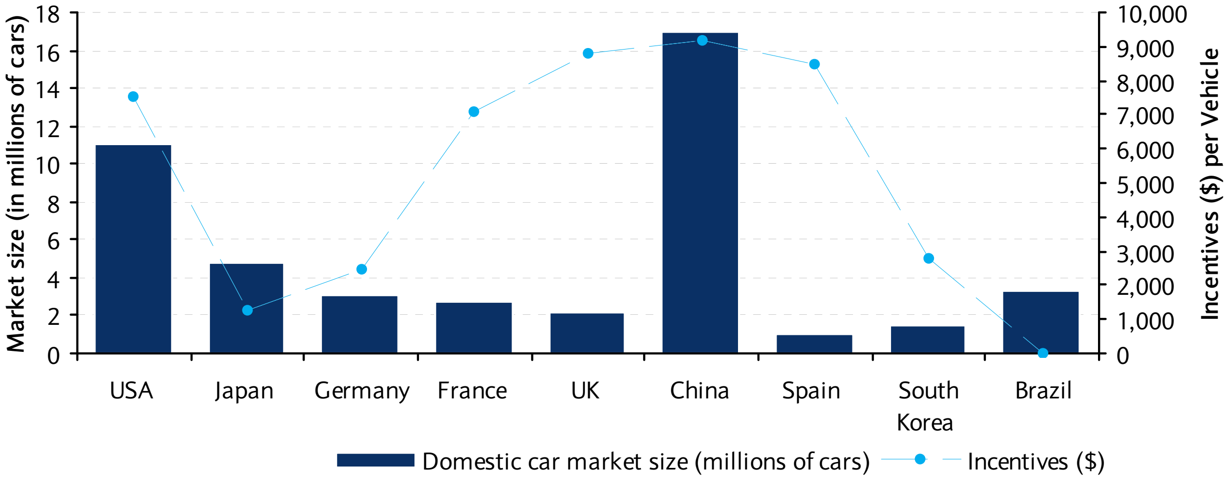
- China has shown strong support for transportation electrification. This is demonstrated by the injection of $15.5 billion in financial incentives, public infrastructure, and development of the domestic automotive industry. In 2010, the Chinese government introduced a two-year pilot program to provide incentives of up to $8,800 for private purchase of new BEVs (battery electric vehicles) and 7,320 for plug-in hybrids in five major cities. The subsidies are paid directly to automakers, allowing for a reduction in vehicle prices. The amount of the subsidy will be reduced once 50,000 vehicles are sold.

- The United States is following a similar approach, providing $2.85 billion in tax cuts and benefits as part of the American Recovery and Reinvestment Act (ARRA), including a federal tax credit of up to $7,500 for EV buyers. Current legislation allows for this credit to be awarded for the first 200,000 vehicles of a model produced. Some states offer additional incentives for EVs, including tax credits, rebates for EV chargers, and access to high-occupancy vehicle (HOV) lanes.
- Japan is reducing the amount of incentives offered for EVs, likely relying on the increase in public acceptance of hybrids that already have a 10% market share.
- Despite the fiscal austerity measures, European governments are adopting rebates and tax credit schemes, with the UK, Spain, and France offering incentives for EV purchasers.

Transportation and energy policy dictated by local governments is playing a key role in the adoption of hybrid and electric vehicles.

Transportation and energy policy dictated by local governments is playing a key role in the adoption of hybrid and electric vehicles. Many countries have set ambitious goals for the electrification of their respective vehicle markets. Despite the overall shift toward electrification of the transportation sector, each country offers a different set of regulations and incentives to promote the usage of electric vehicles. The state policy toward this end is expressed through allocation of funds to research and development and financial incentives to retail customers.

Figure 38: Current Incentives for Full EVs in Major Car Markets



Source: Barclays Capital, Regional Government Websites and Releases

Consumer incentives – such as those provided by the U.S. government and California – aim to lower the initial price point of an xEV.

Since 2009, the United States has focused attention on electrification by funding R&D and providing buyer incentives. Through the Recovery Act and Advanced Research Projects Agency – Energy (ARPA-E) program, the U.S. government is allocating $14 million to the development of novel storage concepts that can drive the cost of storage significantly lower than today's levels. Moreover, through the Recovery and Reinvestment Act, $2.85 billion is being invested in the electrification of transportation. Part of this funding policy — indeed, the key driver for the next two years — is directed at incentives to retail customers.

The financial incentives vary by region and time. As the technology matures it is likely that the incentives will start to fade, but the strong intent of certain key countries (USA, UK, China) to promote energy security and energy efficiency may sustain attractive incentive schemes. For example, the US offers a maximum incentive of $7,500 for the purchase of plug-in vehicles if the storage capacity exceeds 5kWh, while state governments offer additional incentives. California offers up to $5,000 for EVs and $3,000 for plug-in hybrids. These discounts led to a price for the GM Volt plug-in hybrid of $29,780 (starting price $40,280). On the other hand, Brazil (3.3mn sales in 2010) had planned to implement incentives for electric vehicles, but cancelled due to concerns expressed by its robust ethanol industry.

The fiscal austerity policies adopted by most of the EU countries are likely to affect the state-funded EV programs. Despite the macro headwinds, we anticipate countries will seek to align incentives that represent good value for taxpayers, while still ensuring public policy objectives are achieved toward the build-out. The timing of such initiatives is still uncertain given the current economic environment.

China will play an important role in EV growth over the next three years. The Chinese government has targeted 500,000 EVs by 2015, 5mn by 2020.

The Chinese market requires particular attention as it will play an important role in the growth of EVs over the next three years. The government has targeted 500,000 EVs by 2015 and 5 million by 2020. To that end, it has: 1) adopted financial incentives for customers up to $9,300 for full EVs, 2) set up an alliance of companies backed with 100 billion CNY, and 3) ordered the State Grid to prepare 2,300 charging stations and 220,000 charging poles between 2011 and 2015. Local governments offer further incentives. For example, in Shenzhen additional subsidies of RMB 60,000 ($9,300) for complete EVs and RMB 20,000 ($3,105) for plug-in hybrids are being offered, resulting in total consumer subsidies of RMB 120,000 ($18,631) for complete EVs and RMB 70,000 ($10,867) for plug-in hybrids.

There are several Chinese car manufacturers that are exploring production of competitive EVs. However, despite the ambitious goals, only 10,000 EVs were sold in 2010 (to state controlled agencies) and research funds allocated from the Chinese government are low compared to international competitors (see Figure 39). For example, South Korea is investing $342 million through 2014, while Japan, which has the largest market share and a long research tradition in the field of energy storage, is investing $116 million throughout 2012.

China also supplies 95% of rare earth materials.

There are strong indications that EVs will ultimately be successful, namely:

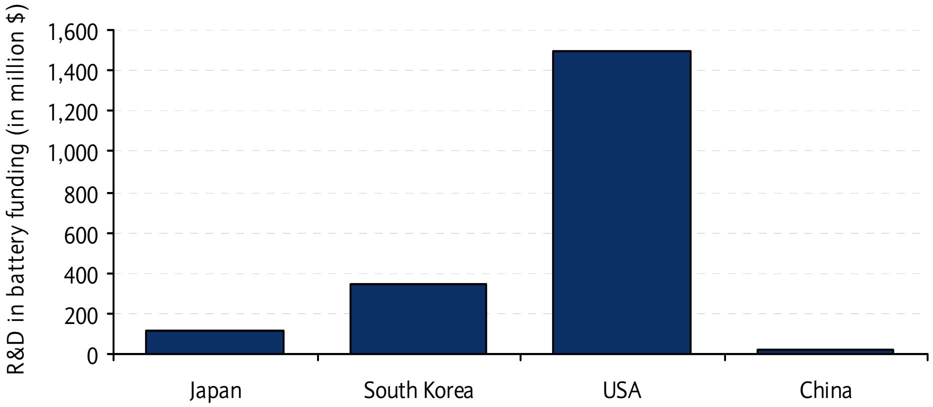
1) the introduction of major OEMs into the Chinese market,

2) the establishment of several Chinese EV companies,

3) the ability of the government to successfully implement its targeted energy policy, and

4) China's exclusivity in rare earth materials as it possesses 30% of the world's reserves and supplies 95%.

Figure 39: R&D Spending of Major Battery Manufacturers



Source: United Nations, "Electric Vehicles in the Context of Sustainable Development in China" (May, 2011)

Figure 40 shows the maximum incentives offered for 2011-12 (including rebates and tax credits for five years) in nine major car markets.

Figure 40: Incentives, 2012-13 Outlook, and Current Cost of Electricity

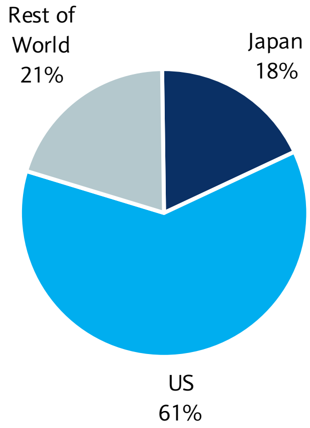
Country (million cars sold in 2010)	Outlook for 2012-2013	Incentive in USD for Plug In Hybrid Vehicle	Cost of Electricity ($/kWh)
USA (11)	Neutral	$7,500	0.112
Japan (4.8)	Neutral	$1,239	0.29
Germany(3.1)	Neutral	$2,460	0.349
France (2.6)	Neutral	$7,094	0.193
UK (2.2)	Neutral	$8,773	0.161
China (17)	Positive	$8,800	0.063
Spain (1)	Neutral	$8,460	0.263
South Korea (1.5)	Neutral	$2,759	0.086
Brazil (3.3)	Negative	$0	N/A

Source: Barclays Capital, Regional Government Websites and Releases

Historically, consumer incentives have contributed to increasing sales of xEVs.

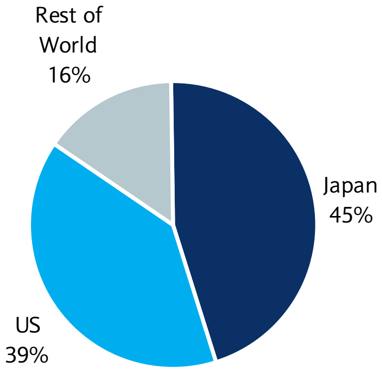
The impacts of government incentives are shown in the Japanese market, where the electricity price is almost three times higher than in the United States. Government incentives, which included tax breaks and a scrappage program ($2,500), boosted the sales of hybrid vehicles and made Japan the leading market in the world during 2009, as shown in the pie chart below.

Figure 41: Hybrids Sales Breakdown for 2008



Source: Polk Research

Figure 42: Hybrids Sales Breakdown for 2009



Source: Polk Research

The cost of gasoline has also been a contributing factor in driving awareness and adoption of xEV technology.

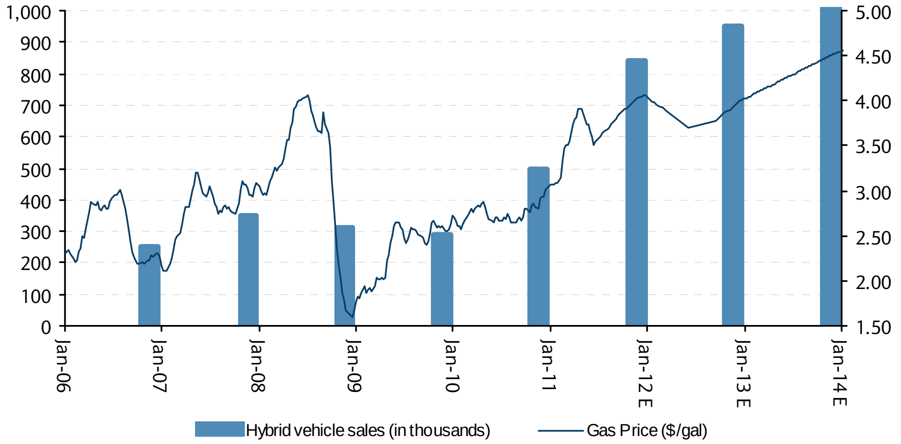
In the U.S. market, the gasoline price seems to have a higher impact than incentives. The graph below shows the historical price of gasoline and the annual sales of hybrid electric vehicles in the United States. In 2006, the U.S. government started providing substantial incentives for hybrid vehicles. Combined with the increasing gasoline price, the sales of hybrid vehicles and its respective market share exhibited strong growth.

In 1Q11, without any incentives for hybrids, sales in the US grew more than 30% y/y.

During 2008-09 the gasoline price fell from around $4/gal to $1.50/gal and the sales of hybrid cars started to decrease. The same trend continued in 2010, when the gas price, although it increased, stayed well below $3/gal and the incentives for hybrids started to fade. However, during the first quarter of 2011 as the price of gas started increasing above $3/gal and without any incentives for hybrids (since they are now offered only to plug-in EVs), the sales of hybrids in the U.S. market grew by more than 30% y/y (higher than the general car market increase of 20% y/y).

In the U.S. market, gasoline prices, even with mild incentives, show a correlation to the sales of hybrids. The market share of HEVs has reached approximately 3% of the total U.S. market. The outlook for the oil price to 2020 remains volatile and a high gasoline price will probably be the norm over the next decade.

Figure 43: Effect of Gasoline Price to the Sales of HEVs in the US Market



Source: Barclays Capital, Energy Information Administration (EIA)

"Range Anxiety" a Concern?

Range anxiety among consumers remains one of the principle concerns hindering the adoption of full-scale EVs.

A common concern that hinders the market penetration of EVs is the range anxiety stemming from the limited max range of a full EV compared to an ICE vehicle. ICE vehicles range around 300-400 miles, while full EVs are around 100-300 miles. Range anxiety refers to the driver's concern with respect to the autonomy an electric vehicle has without a network of charging stations. It is considered an important factor affecting the overall market acceptance of EVs. While average daily driving distances seem to be within the reach of current electric vehicles, consumers need to be comfortable that their car can cover all the possibilities of travel that they may encounter (e.g., leisure and vacation plans).

We believe improved innovation and broader awareness of EVs should help reduce range anxiety over time.

However, research has demonstrated, range anxiety is significantly diminished for EV owners once accustomed to EVs and the information systems used by OEMs. In addition, with current and upcoming technology, EVs are primarily designed for short distances. Their target base is the consumer that commutes daily in cities. As the infrastructure for charging EVs is deployed in the major cities, range anxiety should diminish. At the same time, the combination of: 1) non-financial incentives such as use of bus lanes, parking spaces in downtown areas of metropolitan cities, and 2) discounted electricity prices from utilities that can benefit from increased capacity factors during off-peak hours, result in a convenient and affordable means of transportation. We note here that range anxiety is an issue only for full EVs and not for hybrids or plug-in hybrids where in the absence of charging poles, the ICE charges the battery.

Recharging Infrastructure Creates an Opportunity for Power Utilities

The current range of EVs is roughly 100 miles (for complete EVs) to just below 200 miles for plug-in EVs. To provide the required infrastructure, governments, auto manufacturers, and start-ups are collaborating to provide enough charging stations and/or battery leasing schemes in order to eliminate the range anxiety until batteries increase their energy storage capacity. In addition, the timing that is required to charge the vehicles depends on the capabilities of the recharging equipment.

Publicly accessible charging stations are forecast to jump from 1,400 today to 13,000 by the end of 2012.

Ideally, each plug-in requires at least a charging facility at the owner's "home" parking. At the same time, recharging infrastructure at the workplace is equally important as EV owners will recharge their vehicles while at work. Public infrastructure is required to ensure the reliable and safe recharging of EVs. Today, there are about 1,400 publicly accessible chargers scattered around the country. Pike research projects around 13,000 stations by the end of 2012. In order for consumers to feel comfortable buying an EV, they need to feel comfortable with the infrastructure available to support it.

Finally, the increasing number of plug-in EVs will increase the electrical load. Utilities have a strong interest in the recharging of EVs from the grid. Research has shown that the current projections of EV adoption will not create instability on the grid's operations particularly if the recharging of EVs is done during off-peak hours. Off-peak-hour recharging would offer more favorable costs for the EV owner and would increase load factors for power utility companies.

As EVs Grow, Recycling Will Be Needed

As the number of EVs rises, there are several questions about the recycling of batteries and other EV components after their performance has deteriorated.

Over the last two years, the global recession created a lithium surplus. By 2013 the supply and demand is expected to be in balance again and a production crunch could occur around 2017 and beyond. However, car makers believe that lithium's volume production is not at its peak and therefore the cost of lithium may be further decreased by rising production volumes.

In addition, there is some concern about cobalt, which is an active, rare earth material in cathodes of certain Li-ion batteries as described earlier. However, cobalt is likely to be phased out of vehicle batteries manufacturers in the long term.

Finally, the rare earth materials (such as neodymium and dysprosium) that are contained in the electric motors and the batteries, pose the greatest concern in the industry. As mentioned earlier, several motor manufacturers are trying to replace the current electric motor technology with alternatives that do not require those materials. However, most manufacturers install motors with permanent magnets that offer higher efficiency (up to 30% compared to induction motors). Rare earth materials included in electric motors and batteries are recyclable, by up to 95%, and therefore companies that have this ability are expected to benefit in the event of possible supply shortage.

Secondary Market Needs to Evolve for Longer Term Market Support

Questions around secondary market activity (service, resale value) will be a critical element in determining the xEV market's longer-term success.

We believe questions around the secondary market for xEVs — in particular, full EVs — remain. While EVs have the potential to maintain a comparably higher residual value vs. ICE counterparts, we believe questions such as battery replacement cost, warranties, financing, and the secondary market will need to be resolved in order to support a thriving xEV market. While select members of the value chain are attempting to answer these questions, it will take time to see what happens as broader market adoption takes place.

Figure 44: Powertrain – EV Value Chain

Powertrain raw materials	Powertrain	Recycling	OEMs	Recharging
Cost 60% of motor cost Magnets 45% of motor cost 8.5$/KW of motor power	Cost 19$/kW (KW of motor power)	Cost 2011 $5/kg 2020 2.5$/kg	Cost 1450 $/kWh, (Nissan Versa EV) 2438 $/kWh (GM Volt plug in hybrid)	Cost $300 - $1000 (one time purchase cost)
EBITDA Margin Range: -90% - 47%	EBITDA margin (average) -36%	EBITDA margin 12%	EBITDA margin (average): -5% (without Tesla 11%)	EBITDA margin N/A
Players 10-15 Many in their first year of operation	Players: 10 – 20	Players 1-5	Players 7 – 12	Players Power utilities and few start ups
Techonology Developing mines outside of China, collaborations with chinese mines, operational 2013	Techology Permanent magnets motors (rare earths) Induction motors (no rare earths)	Technology Pyro metallurgical extraction Hydro metallurgical Extraction	Techonology: Hybrid, plug in hybrid, complete EVs	Techonology Fast and regular charging, battery swaps
Cost reduction Induction motors development, mines outside China, China's increase of export quota	Cost reduction Induction motors development (no rare earth materials)	Cost reduction Volume increase	Cost reduction Volume increase	Cost reduction Battery leasing schemes, volume increase
Comments Year end capacity: 100,000 tons, >90% in China 2014: 170,000 tons 60% in China Due to Chinese export quotas supply shortage is expected	Comments Some OEMs develop their own powertrains	Comments Bottleneck possible around 2017 for Lithium Recycling Cobalt will become crucial	Comments Few OEMs dedicated to EVs. Only one of them is developing its own batteries (BYD)	Comments Power utilities can benefit from off-peak hours discounted prices

Source: Barclays Capital

Figure 45: Battery Value Chain

Battery Raw materials	Cell components	Battery	Recycling
Cost 30% of battery cost 2011 cost ::225 $/kWh	**Cost** 50% of battery cost 2011 cost:: 375 $/kWh 2015 cost: 187.5 $/kWh	**Cost** 20% of battery cost 2011: 150 $/kWh 2015: 75 $/kWh	**Cost** 2011 $5/kg 2020 2.5$/kg
EBITDA Margin (average) Cathodes lithium: 32% Cathodes cobalt: 29.2% Anodes: 18% Electrolytes: 17%	**EBITDA Margin (average)** Cathodes : -7.5% (without A123 14%) Anodes: -30% (without altair nano 16%) Electrolytes: 11% Separators: 2.6% (21.4% without Entek)	**EBITDA Margin (average)** 5.6%	**EBITDA margin** 5%
Players Cathodes (6 – 10 Lithium, cobalt) Anodes (1 graphite) Electrolytes (2-5)	**Players** Cathodes: 8-10 Anodes 6-10 Electrolytes: 2-5 Separators: 5 – 7	**Players** 20 – 30 Some battery players fall into cell components category	**Players** 1-5
Materials Steel, Cobalt (rare earth element), Lithium	**Technology** Cathodes with cobalt and without cobalt Anodes : graphite Separators : polymer	**Technology** Some players are in cell components, rest do packaging and electronics/ cooling	**Technology** Pyro metallurgical extraction Hydro metallurgical Extraction
Cost reduction: Development of technologies without rare earth material (cobalt) Operation of new mines outside china	**Cost reduction:** Increase of volume production New cathode technologies Polymer separator for smaller batteries	**Cost reduction:** Increase in volume production Optimize arrangements inside battery pack	**Cost reduction** Volume increase
Comments 2011: – 5% of world lithium production 2020: 10 – 30% of world production) Cobalt: 27% of world's production for batteries	**Comments** 2011 – Cobalt based technologies 2015 – Li-ion polymer, some players with non – cobalt technologies	**Comments** 41 times increase in production capacity in 2011-2015	**Comments** Possible Lithium bottleneck during 2017

Source: Barclays Capital research

TESLA MOTORS INC. (TSLA; 1-OVERWEIGHT/2-NEU); PRICE TARGET $38

TSLA

Stock Rating
1-OVERWEIGHT

Sector View
2-NEUTRAL

Price Target
USD 38.00

Price (08-Nov-2011)
USD 31.84

Potential Upside/Downside
+19%

Tesla Motors Inc.(TSLA): Quarterly and Annual EPS (USD)

	2010	2011			2012			Change y/y	
FY Dec	Actual	Old	New	Cons	Old	New	Cons	2011	2012
Q1	-3.26A	N/A	-0.44A	-0.44A	N/A	-0.68E	-0.63E	87%	-55%
Q2	-3.41A	N/A	-0.53A	-0.53A	N/A	-0.66E	-0.65E	84%	-25%
Q3	-0.37A	N/A	-0.55A	-0.55A	N/A	-0.46E	-0.31E	-49%	16%
Q4	-0.47A	N/A	-0.62E	-0.61E	N/A	-0.17E	-0.12E	-32%	73%
Year	-2.54A	N/A	-2.15E	-2.14E	N/A	-1.97E	-1.81E	15%	8%
P/E	N/A		N/A			N/A			

Source: Barclays Capital
FactSet

COMPANY SNAPSHOT

Tesla Motors, Inc. U.S. Clean Technology and Renewables

Income statement ($mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	117	212	553	1,680	143%
EBITDA	(115)	(199)	(195)	131	NA
EBIT	(126)	(216)	(210)	106	NA
Pre-tax income	(128)	(215)	(207)	108	NA
Net income	(128)	(216)	(207)	108	NA
Reported EPS ($)	(2.54)	(2.15)	(1.97)	1.02	NA
Diluted shares (m)	50	100	105	106	28%
Dividend per share ($)	NA	NA	NA	NA	NA

Margin and return data (%)					Average
EBITDA margin	-98.6	-93.7	-35.2	7.8	-55%
EBIT margin	-107.7	-101.7	-37.9	6.3	-60%
Pre-tax margin	-109.6	-101.4	-37.4	6.4	-60%
Net margin	-109.8	-101.6	-37.4	6.4	-61%
ROIC	-0.70	-0.61	-0.85	0.27	-47%
ROA	-33.2	-30.6	-20.1	8.9	-19%
ROE	-61.9	-94.2	-924.1	82.9	-249%

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	115	301	488	678	81%
Intangible fixed assets	-	-	-	-	NA
Cash and equivalents	100	182	230	133	10%
Total assets	386	706	1,026	1,208	46%
Short and long-term debt	73	306	453	403	77%
Other long-term liabilities	106	171	551	675	85%
Total liabilities	179	477	1,004	1,078	82%
Net debt/(funds)	27	(124)	(223)	(270)	NA
Shareholders' equity	207	229	22	130	-14%
Change in working capital	77	(82)	(295)	(35)	NA
Operating cash flow	(128)	(141)	103	168	NA
Capital expenditure	(40)	(220)	(202)	(215)	NA
Free cash flow	(163)	86	287	356	NA

Valuation and leverage metrics					Average
P/E (x)	NM	NM	NM	31.3	31.3
EV/EBITDA (x)	-12.5	-15.4	-17.0	34.4	- 2.6
FCF yield (%)	-10.2	2.7	8.6	10.5	2.9
Price/sales (x)	13.7	15.0	6.1	2.0	9.2
Price/BV (x)	7.7	14.0	149.7	26.0	49.3
Dividend yield (%)	0.0	0.0	0.0	0.0	0.0
Total debt/capital (%)	26.0	57.2	95.3	75.5	63.5

Selected operating metrics					CAGR
Roadster Shipments	1504	2165	2500	2500	18%
ASP	133.1	147.4	148.7	NA	NA
Model S Shipments	NA	NA	5000	23000	NA
ASP	NA	NA	90.0	85.0	NA
Model X Shipments	NA	NA	NA	1000	NA
ASP	NA	NA	NA	90.0	NA
Total EV Market	20150	89891	221815	383679	167%

Source: Company data, Barclays Capital

Stock Rating	1-OVERWEIGHT
Sector View	2-NEUTRAL
Price (08-Nov-2011)	$ 31.84
Price Target	$ 38.00
Ticker	TSLA

Investment case

The combination of technology leadership, healthy demand, and its focus on the high end market supports our 1-Overweight case. Our price target of $38 equates to 15x our CY14 EPS estimate of $2.50.

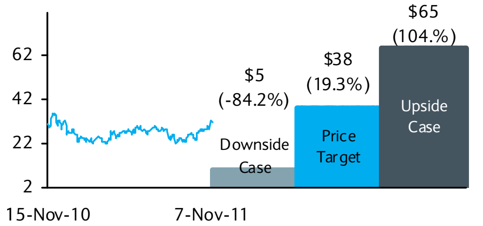
Upside case $ 65.00

Telsa's ability to hit its internal targets as well as garner additional OEM business (Toyota, Mercedes) could support upside to our CY14 estimates to north of $3.00 a share. Further multiple expansion supports our upside case of $65 a share.

Downside case $ 5.00

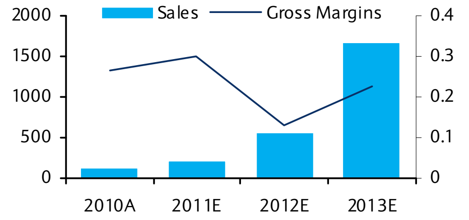
Given its binary nature, Tesla's inability to execute its product schedule would yield a severe cash crunch. Potential liquidation of its assets (including leading IP) provides our downside risk of ~$5 a share assuming a liquidation value in the range of $500M-$1B.

Upside/downside scenarios



Source: FactSet

Sales vs. Gross Margins



TESLA MOTORS (TSLA) – INITIATING COVERAGE AT 1-OW

We initiate coverage on Tesla Motors with a 1-Overweight rating and $38 price target.

We initiate coverage of Tesla Motors (TSLA) with a 1-Overweight rating and a $38 price target. Overall, we consider Tesla a performance leader in the xEV market due to a combination of technology, improving brand, and performance. The company's strategic approach of attempting to disrupt from the top should enable it to better weather a tepid macro backdrop as higher-end consumers are likely to pay for innovation but not necessarily use their EV as their primary vehicle. We believe the company's near-term financing is stable, and provides support until self-sustainability can be achieved in 2H12 and beyond.

Our 2012 estimates are back-half weighted, however, and investors should be aware of the expected revenue declines due to the preannounced shuttering of Tesla's Roadster line as well as the end of a handful of OEM contracts. However, given our recent visit to the company's manufacturing facilities in Fremont, California, we believe Tesla is on track for the launch of its first Sedan, the Model S, and given existing reservations (close to 6,500) we believe our estimate of 5,000 shipments for the year is achievable. Our 2012 sales and EPS estimates are $553mn/$(1.97).

Looking to 2013, ongoing ramp of the Model S coupled with modest expectations for the Model X supports our revenue outlook. More importantly, we expect Tesla to make marked improvement toward its goal of 25% gross margin as it leverages its manufacturing capabilities. We look for sales and EPS of $1,680mn/$1.02 respectively.

Our price target of $38 reflects 37x our CY13 EPS estimate of $1.02 and 15x our CY14 EPS estimate of $2.50. While a lofty multiple, Tesla is one of the fastest growing companies in our clean-tech coverage universe, and in our view, one of the most likely to gain share vs. incumbent vendors.

Company Description

Tesla designs, manufactures, and sells high-performance EVs and powertrain components.

Headquartered in Palo Alto, California, and founded in 2003, Tesla Motors, Inc. designs, manufactures and sells high-performance electric vehicles (EVs) and electric vehicle powertrain components for several automobile manufacturers. The first U.S. automotive manufacturer to go public since Ford in 1956, Tesla has emerged as a leading stand-alone EV vendor. The company owns its sales and service network and has focused its efforts on a bottom-up redesign of its automobiles in order to capitalize on what it believes is a major industry shift in anticipated growing adoption of electric vehicles. Having gained a fair amount of industry attention with the 2006 launch of its first car — the Lotus-based Tesla Roadster — the company's strategic focus is to ultimately establish itself as the EV provider of choice across multiple automobile pricing tiers. Management expects to achieve this goal by gradually moving downstream with more affordable and thus broader appeal through each successive vehicle launch.

The Roadster was a proof-of-concept vehicle that validated Tesla's technology…

…It made consumers reconsider what an EV is capable of.

In our view, the Roadster served primarily as a proof of concept, validating Tesla's technology and helping put the company on the map as a vendor to watch in not just the xEV market, but within the broader automobile arena as well. However, a two seater with a price tag north of $100,000, the Roadster was clearly not intended to be a mass market vehicle, rather was able to dispel some views on the inherent constraints of electric vehicles. The car catered to a niche audience who could both afford the car as well as not have it serve as their primary vehicle. In our view, the company was able to push the boundaries of what electric vehicles could do from a performance perspective. The Roadster can go from

0 to 60 mph in under four seconds and can drive 250 miles on a single charge, pushing the boundaries of what other EVs were capable of doing. In our view, this marked improvement in electric vehicle performance is helping address one of the major concerns facing the adoption of EVs, namely "range anxiety." Coupled with its sleek design, the Roadster forced both consumers and traditional OEMs to reconsider what an EV was capable of.

The Model S targets a broader market but it's still an upper-end offering.

Tesla has already announced that it would no longer be taking orders for the Roadster so it can put all of its efforts behind its more family oriented Model S sedan. The Model S is Tesla's first model designed fully from the bottom up. The Roadster was based on a modified Lotus Elise using Tesla's proprietary electric motor, battery and engineering content. Targeting the luxury sedan market (i.e., BMW, Audi, and Mercedes), the Model S's target audience is broader than its predecessor's, though still at the upper end of the market. The car is a $60,000-$100,000 midsized vehicle and is expected to be available in three price ranges, dependent on battery packages/range and various government incentives. Currently, the company is on track for a launch in 2H12. Management expects to sell 5,000 units in 2012 and 20,000 units over the next two years (2013 and 2014) respectively.

Beyond the Model S sedan, Tesla plans to launch a crossover vehicle in late 2013 dubbed the Model X based on the same drivetrain platform as the Model S. The company then plans to launch its mass-market Gen III platform in 2015, moving its vehicle portfolio further downstream targeting markets comparable to the BMW 3-series.

Outside of pure vehicle manufacturing and sales, Tesla provides powertrain modules and battery packs to Daimler for the Smart fortwo EV and Mercedes A-Class EV. The company also recently announced a contract to supply powertrains for the EV version of Toyota's RAV4 set to launch in 2012. Management indicated that the size of the contract is in the range of $100 million in revenues in the 2012-14 time period. Based on comments during its 3Q11 earnings call, we believe that Tesla is in discussions for a potential contract with Toyota that could result in revenues "orders of magnitude greater" than the recently announced powertrain supply business for the Toyota RAV4.

Investment Positives

A Binary Outcome

On face value, an investment in Tesla seems to be a fairly binary event. Management's inability to achieve near-term milestones could lead to a severe strain on its capital resources requiring Tesla to raise additional capital in order to fund ongoing operations. Over the longer term, any execution missteps would therefore hinder the company's ability to diversify its product offering and achieve its vision of tapping a larger addressable market which is ultimately the cornerstone of its ability to become a self-sustaining profitable business. Of course, Silicon Valley and the auto industry are both littered with examples of companies that have boldly tried to challenge the status quo in various end markets only to be relegated to the history books as collectors' items.

Undoubtedly, Tesla is making an audacious move in attempting to emerge as an upstart in an industry that rarely sees upstarts. The company is attempting to redefine the experience of an electric vehicle in looking to make the experience of buying, owning, servicing and most importantly driving a Tesla competitive and even better than other models available in the market. Tesla doesn't seem to be taking the approach of wanting to be the best electric vehicle in the market, rather it is looking to take the approach of being the best car available for a given price range.

A Disruptive Force in the Auto Industry?

If the company is successful in hitting its milestones, however, we believe that Tesla could be viewed as a pioneer in the market, having not only redefined expectations for electric vehicles but also providing the company with significant runway in order to tap a potentially lucrative market. As mentioned earlier in this report, we expect total xEV demand (EVs, HEVs, PHEVs) to reach 4.8 million units in 2020 globally.

A High Performance Vehicle – Not Just Another EV

As highlighted in our xEV market overview, we believe that near-term adoption is likely to be driven by wealthier consumers who can afford to have an EV as their secondary car. With a targeted retail starting price of $49,900 (net of total tax credits) we believe Tesla is taking the right approach in targeting a more affluent consumer group, one that is likely to pay for innovation and be less concerned with longer term fuel savings.

Near-Term Expectations Are Limited…

Given the multi-year ramp of Tesla's build-out plans, near-term revenue and EPS expectations are somewhat immaterial. As the Model S isn't expected to ship until the back half of 2012, we believe that it has been well telegraphed that: 1) the tailing off of sales from the discontinuation of the Roadster, and 2) decline of the Smart, Mercedes A-Class, and Toyota RAV4 development contracts (which will each wind down by 1Q12) is likely to lead to a revenue pocket in the first half of the year. Moreover, with 6,500 reservations for the Model S collected through 3Q11, management's expectations for 2012 shipments of 5,000 units seems conservative. As long as the company's expenses do not run well ahead of plan (increasing concerns for rising capital needs in order to fund the rollout of its Model S and X lines), we do not believe that investors are likely to be highly focused on near-term revenue and operating results.

…Thus Investors are Likely to Take a Long-Term View

Thus we believe that an investment in Tesla's shares today is an investment in assessing the company's longer-term prospects. In other words, one must take a longer-term view on Tesla as the company either succeeds in meeting its goal in becoming a high-volume EV provider or ultimately does not remain viable as a stand-alone entity.

Investment Risks

This is an Execution Story

Any serious miss-execution or failure surrounding demand of the Model S sedan would severely impact Tesla's ability to participate in the xEV market and longer-term market adoption. While the company has proven that it can be successful in designing compelling automobiles for a niche sector, ultimately the company's longer-term viability will be dependent on Tesla's ability to garner share in more mass-market arenas. Our current forecasts have Tesla burning through cash through mid-2012, at which point it will need to rely on cash generated from the Model S in order to support its business. In our view, this magnifies the importance of the need for near-term success in order to get the company to the next phase of its operating plan.

David in a Market of Goliaths

Tesla clearly is a company with lofty ambitions given it is not only looking to tap a market dominated by larger scale and better capitalized competitors, but its strategy is based on relying on a new technology that is unlikely to be fully competitive with the incumbent technology (i.e., the internal combustion engine) for the next several years at the very least. The company is likely to face an increasing array of competition from both new entrants and existing OEMs as billions in investment and engineering resources is being funnelled into the development of xEVs. Moreover, the company's initial success will be dependent on tapping buyers in the luxury sedan market (i.e., Audi, Mercedes, and BMW), many of which have their own approaches to the xEV market, as well as strong incumbent brands. Therefore, in order for Tesla to successfully achieve its milestones, management must not only build a brand that equates the company's products as the best xEVs in the market, but also provide a competitive offering vs. other models that already have strong brand recognition.

Reliance on Government Incentives to Support Market Growth

We believe significant long-term government coordination is required to provide incentives in order to support multiple layers of the xEV market. These include initiatives that support the development of battery technologies, build out the necessary grid infrastructure (which will also require coordinated efforts from utilities and government at the local, state, and federal level), and the lowering of upfront costs associated with the initial price of an xEV. Though the federal government has been supportive of xEV adoption thus far (e.g., the Advanced Technology Vehicles Manufacturing Loan Program of late 2008), that support must remain in place and coordinated for at least the next decade in order to support the infrastructure and incentives necessary to drive adoption.

Pace of Consumer Acceptance of xEVs

Most importantly, Tesla's business model is dependent on consumer acceptance of xEVs as a viable alternative to models offering internal combustion engines. In order to drive broader adoption, we believe that, over time, xEVs must offer consumers significant value at least on par with, to better than, the value offered by internal combustion technologies, particularly when the policies that support purchases are removed. In other words, for electric vehicles to achieve substantial penetration within the broader automobile space, we believe the economics must eventually work relative to internal combustion vehicles. Currently, market demand seems supported by well-to-do environmentalists and electric vehicle enthusiasts. However, these first-to-market adopters are not enough to ensure the viability of the xEV market. If vehicles offered are not safe, reliable, enjoyable, along with providing a substantial cost/benefit, xEV adoption is likely to lag even the most modest expectations.

High Insider Ownership and Short Interest Equals Volatility

Given Tesla's binary investment outlook, its high insider ownership is likely to lead to a high degree of share volatility. Specifically, CEO Elon Musk owns nearly 28.2% of shares outstanding (as of June 20, 2011) with the rest of management at 48.5% combined. In total, the public float represents 23.3% of shares outstanding. The company also has a short interest of 20.37% and thus the combination of high insider ownership and high short interest suggests the potential for material share volatility.

TSLA – Our View

Demand is healthy but can Tesla deliver on its expectations?

In our view, Tesla's story is not a demand story, but rather an execution story. Overall, the company has sufficient reservations for its Model S to meet its near-term demand expectations and shipments for 2012. The question is whether Tesla can deliver on hitting those expectations. In our view, the bear call on Tesla is that start-ups in the automotive industry just don't work, particularly a comparatively smaller scale OEM that utilizes a fully integrated manufacturing model and depends on a new and unproven technology as its value proposition. Moreover, with the anticipated ramp down of its Roadster model and two of its OEM constructs in the beginning of 2012, revenues are expected to materially decline in 1H12 until sales from the Model S begin to contribute to its top line, causing some additional pressure to the consensus view.

Given its high-end focus, Tesla should be relatively less affected by any reduction in government incentive programs.

In our view, Tesla has a number of factors working in its favor. First and foremost, demand is healthy. We believe the company's reservation trends indicate that there is strong appetite for the Model S. We believe Tesla sits at the right niche of the EV market, focused on high-end users who are willing to pay for innovation and performance and would be relatively less bothered by a tepid economic backdrop. On the execution front, we have been impressed by the company's ability to ramp up its NUMMI facility, and thus believe it is well on track to meet its launch deadlines. We also note that while political pressure has focused on a re-examination of the DOE's loan program, absent a complete withdrawal of the program (i.e., a complete reversal of the loan agreement) Tesla does not need additional government money for its operations. Moreover, if the federal government were to remove incentives for purchasing xEVs, we believe Tesla would be less impacted given its focus on the high-end performance market. Below we highlight our investment outlook based on the aforementioned criteria.

Figure 46: Tesla (TSLA) Investment Framework

Market Growth Opportunity	●	- Overall, we consider the electric vehicle market the fastest growth submarket within the renewables and clean technology space.
Potential for Share Gains	◕	- We consider Tesla well positioned to gain share in the xEV market, particularly given its strategy of focusing on the high-end segment. - The company's reservations of 6500 provides healthy visibility for at least the near term, supporting its demand trajectory.
Likelihood of Margin Expansion	◕	- We expect Tesla's margins to significantly decline in 1H12 as it ramps the production of its Model S, and sales of its current powertrain contracts and Roadster decline. However, in 2H12, we expect margins to begin to rebound as the company switches from prepping the sale of the Model S to selling it. - While we expect the company's annual factory utilization to remain below its maximum capacity of 10,000 units, we believe the company's target of 25% gross margin is doable over time.
Barriers to Entry	◕	- The Model S' range of 300 miles per charge is an industry-leading differentiator, and thus should enable the company to remain ahead of competition in the all-EV market. - We also believe that brand, distribution, and the company's unique financing structure (building out its operations for cents on the dollar) are also key barriers to entry.
Capitalization	◑	- Tesla has stated capitalization for the near term supported by the DOE loan which it expects to draw down fully by mid-2012. - Longer term, inability to gain material traction with the Model S would likely make Tesla unable to fund future operating plans.
Risk Profile	◑	- We believe there is limited near-term risk to the company's financing, though recognize that self sustainability will depend on the company's ability to execute to plan. - Demand is less of an issue (given the company's reservations) rather the risks associated with Tesla are execution related, in our view.
Valuation	◔	- Tesla's valuation is lofty, given expectations for further earnings declines in 1H12 ahead of our expectations for a 2H12 ramp in revenue. TSLA is trading at approximately 31x our CY12 EPS estimate, at the high end of our coverage universe. Given our expectations that the company will not be at full volumes for its first commercial car until 2014, we believe a multiple based on our outlook for that year is more appropriate, which is a more reasonable (based on our expected growth profile) multiple of 12x.

Source: Barclays Capital

Background

History

Co-founded by serial entrepreneur Elon Musk, Tesla designs, manufactures and sells high-performance electric vehicles.

Co-founded (along with four other individuals including Martin Eberhand, Marc Tarpenning, Ian Wright, and JB Straubel) in 2003 by serial entrepreneur Elon Musk, Tesla Motors, Inc. designs, manufacturers and sells high-performance electric vehicles (EVs) and electric vehicle powertrain components to several automobile manufacturers. The first U.S. automotive manufacturer to go public since Ford in 1956, Tesla has emerged as a leading independent developer of EVs. The company owns its sales and service network and has focused its efforts on a bottom-up redesign of automobiles in order to capitalize on what it believes is a major industry shift with the anticipated growing adoption of electric vehicles. Having gained the market's attention with the 2006 launch of its first high-end car, the Lotus-based Tesla Roadster, the company's long-term strategy is to ultimately emerge as the EV provider of choice across multiple pricing tiers supporting a business model as a high volume sustainable supplier of EVs to the market.

Redesign from the Ground up

Tesla's focus is to redesign the "automotive experience" from technology all the way to the point of sale from the ground up.

Tesla's overall strategy is to build not only an automobile, but an automobile company from the ground up. Tesla's, or any xEV company's, success is dependent on the ability to make a cost-competitive and functionally competitive automobile that lures in new consumers and helps to dispel concerns about electric vehicles. Systematic support must also be forthcoming if the entire ecosystem is to thrive. Thus, in order to do its part, Tesla has not only worked on a full redesign of its automobile from the ground up, but will manufacture the cars in its NUMMI manufacturing plant in Fremont, California, to fully control the quality of its vehicles.

However, Tesla's vision doesn't stop with just the manufacturing process. The company currently sells its cars through its own showrooms located nationwide which offer free Wi-Fi, food, and beverages giving prospective customers a complete experience, far different from the average car purchase. Tesla also goes the extra mile with its service and maintenance program and even offers to make "house calls" to Roadster owners if they can't make it into a service center. The company's goal is to change the way consumers view the electric car market and it is thus prepared to focus on changing the holistic approach toward how EVs are designed, manufactured, sold, and managed.

The Secret Is in the Sauce

We consider Tesla, at its core, a technology company, as its primary focus has been re-defining what an EV can do through its battery technology.

As part of its ground-up approach toward redesigning the electric vehicle, a great deal of effort has been put into the technology surrounding the battery pack, drivetrain, and various software applications needed to run the vehicle. Primarily sourced through Panasonic (which also happens to be an investor in the company), Tesla utilizes the 18650 lithium-ion cell form factor (18mm diameter by 65mm length) as its primary power source. With twice the volume of an AA-size battery, the cylindrical 18650 is typically found in laptop computers. Because the 18650 has been in mass production for longer than a decade, Tesla's goal is to leverage economies of scale in order to drive down the price of the battery pack.

The Roadster utilizes 6,831 batteries connected together and packaged with its Smart BMS (battery management system) which effectively manages the challenges of having a pack with thousands of individual cells. The BMS provides applications such as a charge controller to monitor and level the charge so that they don't get damaged or overcharge, real-time monitoring of the voltage in each cell to isolate any damaged ones, provide temperature sensors to manage discharge current and cool the cells, and various systems that reduce changes that can lead to capacity fade. Overall, the pack provides 200kW of power and 53kWh of useable energy; enough to power an average U.S. home for two days.

Tesla has been working on improvement across the board with its battery pack design focusing on manufacturing cost, energy density, and material cost. Management has indicated that the Model S's battery pack will reduce the amount of cobalt required by close to one-third (a significant cost) increasing energy density by approximately 40%, and including the ability to swap out battery packs to enable the use of battery changing stations. In our view, one of the critical elements of the Tesla story and its viability as a self-sustaining volume provider of electric vehicles will be its — and the industry's, for that matter — ability to deliver improved battery technology going forward.

Benefiting from a Perfect Storm?

We believe it would be very difficult for another company to replicate the unique series of events that has enabled Tesla to build out its current assets.

Tesla leveraged Department of Energy Loans and its IPO proceeds in order to expand capacity at a time of broader turmoil within the automotive industry. Its principle manufacturing facility, located in Fremont, California, was purchased from Toyota in May 2010 for $42 million and officially opened in October that same year. The plant is the first dedicated assembly plant for electric vehicles and the home of the Model S sedan. Moreover, various components of its manufacturing technology were purchased from other OEMs for cents on the dollar. While the company has invested a significant amount in its Fremont facility since purchasing it, we believe its opportunity to capitalize on a unique set of circumstances may have given Tesla the ability to build significant capacity at a fraction of the cost of other OEMs. In other words, we believe that in the current environment, it would be difficult for any start-up to replicate the scenarios by which Tesla was able to build out its production facilities.

Tesla's Product Roadmap

Tesla's focus is to build out a portfolio of vehicles starting from the high end and working its way down.

We expect Tesla to announce a roster of new models in the next two to five years, broadly in line with its strategy of driving lower cost higher volume vehicles into the market.

Figure 47: Tesla Product Roadmap

Model Name	Price Tag	Launch Date	Targeted Units	BarCap Estimated Units
Roadster	$109,000	Shipping since 2008	2,500 Units by 2012 (end of production)	2,500 Units by 4Q12
Model S	Starting at $49,900	Mid-2012	5000 Units in 2012 20,000 Units in 2013	5,000 Units in 2H12 18,000 Units in 2013 19,000 Units in 2014
Model X	Starting at $49,900	Prototype reveal by end of 2011 Start deliveries in 4Q13	10,000-15,000/yr	1,000 Units in 4Q13 12,000 Units in 2014
Tesla Gen III	Starting at $30,000	TBD	100,000+ units/yr*	TBD

* on an annualized basis at full capacity

Source: Tesla, Barclays Capital Research

The company's prior and upcoming models include the following:

Roadster: High-End Proof-of-Concept Car

The Roadster served as Tesla's proof-of-concept car, surpassing capabilities of prior EVs.

The Roadster was Tesla's first model in the market place, and in our view served as a proof of concept for the company's technology. Launched in 2006, it helped put Tesla on the map as a company to watch, not just in the xEV market, but within the broader automobile arena as well. A high-performance vehicle, the car was based on a modified Lotus Elise utilizing Tesla's proprietary battery and electric motor technologies.

Figure 48: Tesla's Roadster

Source: Tesla Motors Inc.

However, a two-seater with a price tag north of $100,000 (MSRP starts at $109,000 excluding options, with the Sport version costing $128,500), the Roadster was clearly not intended to be a mass market vehicle. Rather, the car served as Tesla's coming out party, enabling the company to showcase its technology while simultaneously dispelling some embedded concerns on the inherent constraints of electric vehicles. The Roadster pushed the boundaries of what electric vehicles could do from a performance perspective. The car can go from 0 to 60 mph in under four seconds and can drive 250 miles on a single charge, helping to curb range anxiety generally attributed to first-time EV purchasers. Management has since announced that it would no longer be taking orders for the Roadster so it can put all of its efforts behind its more family-oriented Model S sedan. Lifetime production has been limited to 2,500 and we expect shipments of 335 in 2012 as the model winds down.

Model S: First Fully Designed from Scratch Model

The Model S will be the company's first entry into the luxury sedan market.

The Model S is Tesla's first model designed fully from scratch and is built in the company's Fremont facility in northern California. The company acquired the facility from New United Motor Manufacturing (NUMMI) in May 2010. Targeting the luxury sedan market (i.e., BMW, Audi, and Mercedes), the Model S is targeting a broader target audience than its predecessor, though still at the upper end of the market. The car is a roughly $60,000-$100,000 (before tax subsidies) midsized vehicle and is expected to be available in three price ranges, dependent on battery packages/range and various government incentive plans. The Model S is a five-seater luxury sedan that features sports car–like performance (0-60mph in 5.6 seconds) and provides an expected battery range of 300 miles per charge at the high end. Because the car does not have many of the parts of a traditional car, the model has more cargo and interior space vs. other sedans in its class.

Figure 49: Tesla's Model S

Source: Tesla Motors Inc.

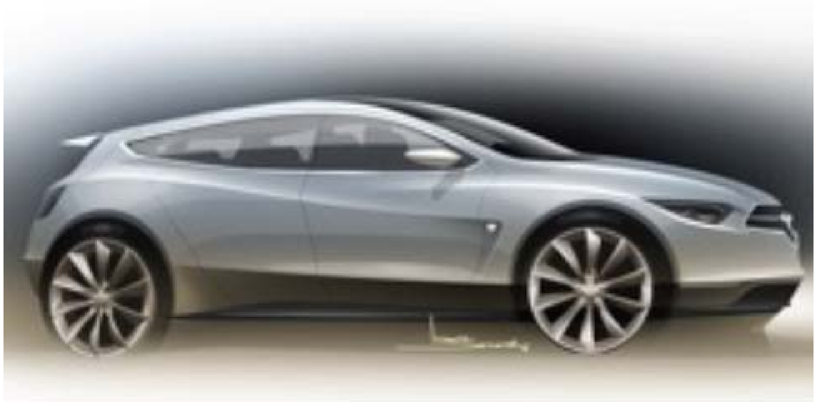
Following its recent beta test launch in early October which we attended, we believe that it is clear the company is on track for a launch in 2H12. Management expects to sell 5,000 units in 2012 and 20,000 units over the subsequent two years (2013-14). With 6,500 reservations for the Model S collected through 3Q11, management's expectations for 2012 automotive sales seem conservative. However, as previously highlighted, we believe execution of the Model S platform is key in order to validate Tesla's strategy and enable the company to move from niche player to viable competitor in the mass market xEV space. In total, Tesla has earmarked $500 million for the total development of the Model S. Our current estimates call for 5,000 shipments in 2012 (supported by the company's 6,500 reservations at the end of 3Q11), with an increase to 18,000 in 2013 (below management's expectations of 20,000) and 19,000 in 2014.

Model X: The First Crossover

Leveraging the Model S technology, the Model X is Tesla's next step toward broadening its portfolio with a crossover vehicle.

The Model X will be Tesla's first crossover vehicle based on the same drivetrain platform as the Model S. However, similar to the Model S, because the car does not have many of the parts of a traditional car, the model is also expected to have more cargo and interior space vs. other vehicles in its class and thus will be closer to providing functionality similar to a minivan. With the launch still several years away (a late 2013 targeted launch), Tesla plans to unveil the design prototype by the end of the current year.

Figure 50: Tesla's Model X



Source: Tesla Motors Inc.

We currently factor in modest expectations for the Model X of approximately 1,000 units in 2H13 with a blended ASP broadly in line with the Model S (approximately $90,000).

Gen III

Tesla's Gen III will be the company's first entry into a lower-cost, mass-market option for a broader set of consumers.

Following the launch of the Model S and the Model X, which are geared toward demonstrating Tesla's value proposition to broader markets, the launch of the company's Gen III platform is intended to demonstrate Tesla's ability to become an independent and, more importantly, sustainable high-volume manufacturer of electric vehicles. The company is targeting a step lower in the market — akin to a BMW 3-series — with its Gen III platform. Initial launch is expected in 2015.

OEM Supplier

Core to its technology roots, Tesla also licenses its technology to other OEMs including Daimler and Toyota.

Outside of pure manufacturing and sales, Tesla's fastest growing business is supplying various OEMs with battery packs and motors. Currently, Tesla has three major products at either the production or development phase, though we suspect that over time the company is likely to find additional partners. Tesla provides powertrain modules and battery packs to Daimler for the Smart fortwo and A-Class electric vehicle. The company also recently announced a contract to supply powertrains for the EV version of Toyota's RAV4 set to launch in 2012. Management indicated that the size of the contract is in the range of $100 million in revenues in the 2012-14 time period. Based on comments by management on its 3Q11 earnings call, we believe Tesla is in discussions for a potential contract with Toyota that could result in revenue "orders of magnitude greater" than the recently announced powertrain supply business for the Toyota RAV4.

Management Team

Senior management has had leadership positions across high profile technology firms (Apple, Google, Paypal) as well as traditional automotive OEMs (Audi, BMW, Ford, GM, Mazda, Toyota, Volvo.).

Led by serial entrepreneur Elon Musk (PayPal, Zip2, SpaceX, SolarCity), Tesla's management team is a mix of technology and automotive executives. Among their collective experience, senior management has had leadership positions across high-profile technology firms (Apple, Google, Paypal) as well as traditional automotive OEMs (Audi, BMW, Ford, GM, Mazda, Toyota, Volvo). In our view, an investment in Tesla is clearly a call that this management team can execute and effectively deliver on their promises to not only ship approximately 25,000 cars in 2012-13, but to do it in a way that enables the company to enjoy gross profits broadly in line with other industry peers.

- **Elon Musk:** Mr. Musk has served as Tesla's CEO since October 2008 and as Chairman of the company's board of directors since April 2004. Mr. Musk also currently serves as CEO, CTO and Chairman of Space Exploration Technologies Corp., a company which is developing and launching advanced rockets for satellite and eventually human transportation and as Chairman of SolarCity, a solar installation company. Prior to joining Space Exploration Corp., Mr. Musk co-founded PayPal, an electronic payment system, which was acquired by eBay in October 2002, and Zip2 Corp., a provider of Internet enterprise software and services, which was acquired by Compaq in March 1999. Mr. Musk is currently Tesla's largest shareholder.

- **Deepak Ahuja:** Mr. Ahuja has served as Tesla's CFO since July 2008. Prior to joining the company, Mr. Ahuja served in a variety of positions at Ford from August 1993 to July 2008. His most recent positions were the Vehicle Line Controller of Small Cars Product Development from July 2006 to July 2008 and as CFO for Ford of Southern Africa from February 2003 to June 2006. Mr. Ahuja also served as the CFO for Auto Alliance International, a joint venture between Ford and Mazda, from September 2000 to February 2003.

- **Jeffrey Straubel:** A co-founder of the company, Mr. Straubel has served as Tesla's CTO since May 2005 and previously served as Principal Engineer, Drive Systems from March 2004 to May 2005. Prior to joining the company, Mr. Straubel was the CTO and co-founder of Volacom Inc., an aerospace firm which designed a specialized high-altitude electric aircraft platform, from 2002 to 2004.

- **Gilbert Passin:** Mr. Passin has served as Tesla's VP of Manufacturing since January 2010. Prior to joining the company, Mr. Passin held various positions at Toyota Motor Engineering & Manufacturing North America from 2005 to January 2010. His most recent position with Toyota was General Manager of Production Engineering for West Coast. Previously, Mr. Passin served as a Vice President of Manufacturing, for the company. Mr. Passin also served as a Vice President and General Manager of Volvo Trucks North America at the New River Valley Plant, from 2002 to 2005 as well as Vice President and General Manager of Mack Trucks Inc. at the Winnsboro Assembly Facility from 2000 to 2002.

- **George Blankenship:** Mr. Blankenship has served Tesla's Vice President, Sales & Ownership Experience since July 2010. From March 2009 to June 2010, Mr. Blankenship served as a real estate consultant for Microsoft Corp. Prior to his position at Microsoft, he served as Vice President, Real Estate for Apple Computer from May 2000 to September 2006. Between June 1980 and June 2000, Mr. Blankenship served in various positions with GAP, Inc., most recently as Vice President, Retail Strategy.

- **Eric Whitaker:** Mr. Whitaker has served as Tesla's general counsel since October 2010. From October 2007 to October 2010, Mr. Whitaker served as Executive Vice President and General Counsel of Avalanche Technology. From December 1999 to July 2006, he served in various positions at Lexar Media, Inc. most recently as Executive Vice President of Corporate Strategy, General Counsel and Corporate Secretary. From October 1995 to December 1999, Mr. Whitaker was an attorney with Latham & Watkins.

Tesla – Outlook and Estimates

Capital Structure

Tesla currently has a healthy capital structure. At the end of 3Q11, the company has a cash balance of $213 million and an available DOE facility of approximately $240 million remaining of its $465 million loan. In our view, coupled with expected cash generation from growing reservations of its Model S, the company has sufficient liquidity to fund its operations through the ramp of the Model S in 2H12.

As of 3Q11, Tesla has drawn $225 million from the DOE loans and therefore has approximately $225 million in long-term debt. As the company progresses with its current production activities, it will continue making draw-downs under the DOE Loan Facility. Quarterly repayments of the loan will not begin until December 2012. Other corporate investments from Daimler, Toyota, and Panasonic, as well as a $31 million sales tax exemption from the state of California will also help keep the company financially stable as it continues production of the Model S and X. In our view, customer adoption and sales of the Model S and X will be important for Tesla to remain a competitor in the EV industry and ultimately drive a sustainable cash-generative business model.

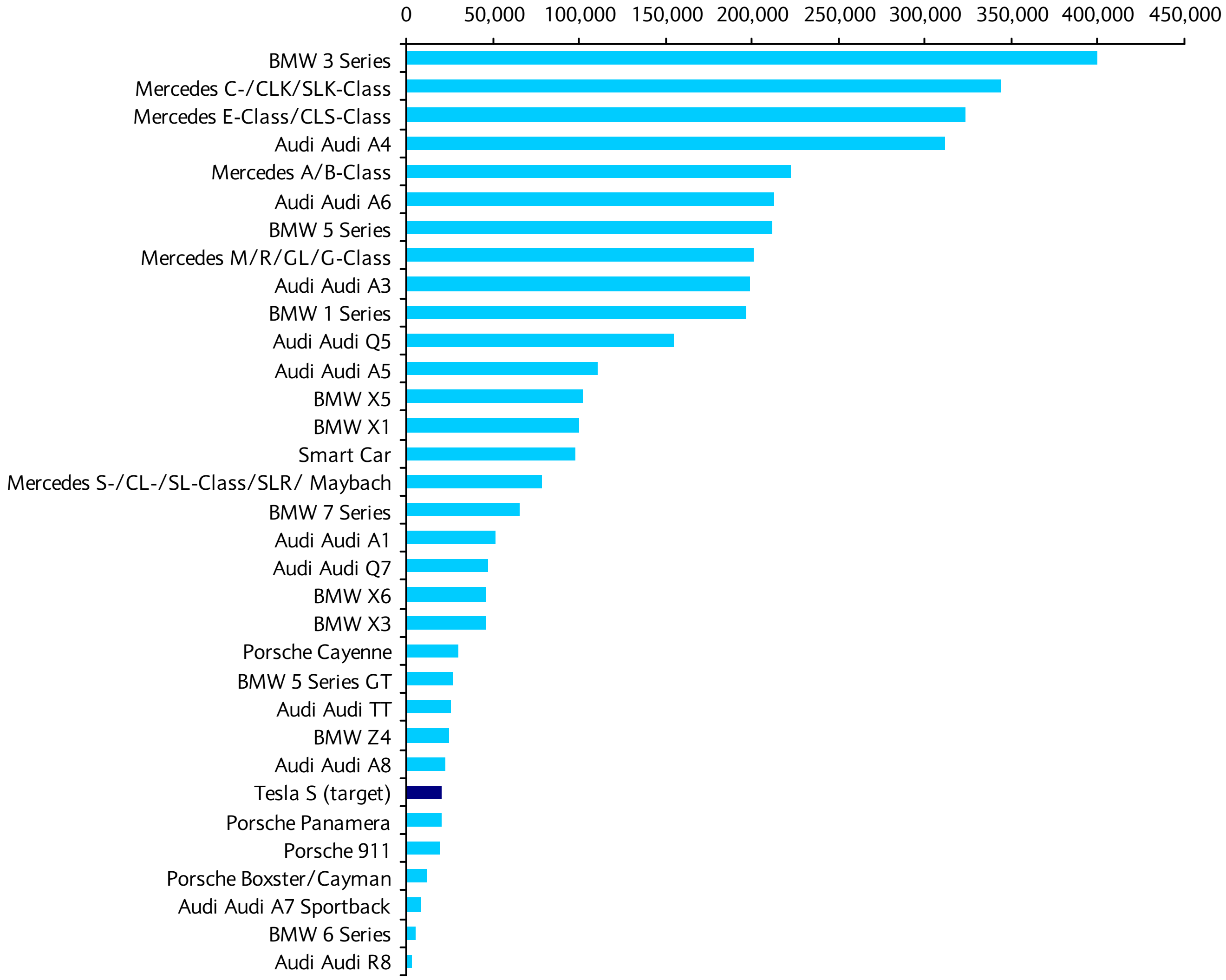
Estimates and Valuation

An Execution Story

In our view, Tesla is not a near-term demand story, but rather an execution story. Based on the company's reservations of 6,500, Tesla has sufficient demand to meet its internal targets for the Model S in 2012. The key question between now and eight months from now is whether Tesla can get its NUMMI facility up and running and produce the Model S at volumes required to lead it to a sustainable operating model. Based on our own visit to the facility, we believe Tesla has made material progress in getting the facility up and running. According to management, equipment installation at the factory is 90% complete, and the company remains on track to hit its targets. While there are clearly a number of potential challenges between now and next June, based on our assessment, the company continues to make material progress in achieving its targets.

While we believe Tesla is in a strong position to gain share, as a premium player, it is important to understand what 20,000 units actually means in the context of the broader luxury car market. As highlighted by the table below, over a one-year period, 20,000 shipments would be at the low end of the range of luxury automobiles worldwide, broadly in line with Porsche's Panamera and well below Audi's TT. Though the Model S is not a direct competitor to either model, our analysis indicates that there is a fair amount of demand available for Tesla to meet its targets.

Figure 51: 2011 Estimated Worldwide Luxury Car Shipments by Model



Source: Industry reports, Barclays Capital estimates

For 2012 we are establishing a revenue estimate of $553 million, based on expectations of a wind down of the Roadster line and approximately 5,000 shipments of the Model S sedan. We note that a ramp down of a handful of Tesla's OEM partnerships plus the tailing off of Roadster revenues make 2012 highly back-end loaded and dependent on the successful launch of the Model S (a risk we believe investors need to be keenly aware of). For 2013, we expect a ramp in the Model S line, with shipments of approximately 18,000 units (below management's expectations of 20,000 units), yielding revenues of $1.7 billion. Further traction with the Model S as well as a modest contribution from the initial launch of the Model X lead to our 2014 estimate of $2.6 billion.

From a bottom-line perspective, we expect management to continue to invest in order to support the launch of the Model S. We note that a ramp in Tesla's manufacturing costs is actually embedded in its operating expenses until the launch of the vehicle. After the launch, we expect a step-down in costs, until the company begins to re-ramp its efforts for the launch of the Model X. Therefore, given our expectations for declining revenues in

1H12 (due to the previously aforementioned factors) and expectations for ongoing investment, we expect earnings losses to continue into 2H12 until sales of the Model S commence. We therefore establish a 2012 EPS estimate of $(1.97). For 2013, we expect improved utilization, revenue ramp from sales of the Model S and lower operating expenses combined provide a path to profitability with Tesla's bottom line crossing over to positive territory mid-year. We therefore look for EPS of $1.02 in 2013. Further traction of the Model S, and limited contribution of the Model X, lead to our 2014 EPS estimate of $2.50.

Based on our estimates, Tesla is one of the fastest growing companies in our U.S. Clean Technology & Renewables coverage universe. It is also one of the highest multiple names relative to 2013 estimates. As previously mentioned, we consider Tesla a binary event: either the company is able to execute to plan (which we do not believe is baked into current expectations) or it is another "shooting star" in the technology world. Given what we consider is a solid strategic positioning within the auto market (i.e., attempting to disrupt from the high end) initial demand trends (as evidenced by its strong reservation growth) and core technology (one of the longest distance electric cars available in the market) we believe the company has what it takes to succeed in the market. We are thus initiating coverage with a 1-Overweight rating and a $38 price target. Our target equates to 15x our CY14 EPS estimate of $2.50.

A123 SYSTEMS INC. (AONE; 2-EQUAL WEIGHT/2-NEU); PRICE TARGET $4

AONE

Stock Rating
2-EQUAL WEIGHT

Sector View
2-NEUTRAL

Price Target
USD 4.00

Price (08-Nov-2011)
USD 3.16

Potential Upside/Downside
+27%

A123 Systems Inc.(AONE): Quarterly and Annual EPS (USD)

	2010	2011			2012			Change y/y	
FY Dec	Actual	Old	New	Cons	Old	New	Cons	2011	2012
Q1	-0.28A	N/A	-0.51A	-0.51A	N/A	-0.41E	-0.30E	-82%	20%
Q2	-0.33A	N/A	-0.44A	-0.44A	N/A	-0.41E	-0.29E	-33%	7%
Q3	-0.42A	N/A	-0.51A	-0.51A	N/A	-0.36E	-0.24E	-21%	29%
Q4	-0.43A	N/A	-0.47E	-0.35E	N/A	-0.35E	-0.21E	-9%	26%
Year	-1.46A	N/A	-1.92E	-1.69E	N/A	-1.54E	-1.08E	-32%	20%
P/E	N/A		N/A			N/A			

Source: Barclays Capital
Consensus numbers are from Thomson Reuters

COMPANY SNAPSHOT

A123 Systems, Inc. U.S. Clean Technology and Renewables

Income statement ($mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	97	169	378	556	78.7%
EBITDA	(121)	(185)	(150)	(90)	NA
EBIT	(138)	(210)	(177)	(117)	NA
Pre-tax income	(152)	(231)	(198)	(138)	NA
Net income	(153)	(232)	(198)	(138)	NA
Reported EPS ($)	(1.46)	(1.92)	(1.54)	(1.05)	NA
Diluted shares (m)	104	121	129	132	8.1%
Dividend per share ($)	NA	NA	NA	NA	NA

Margin and return data (%)					Average
EBITDA margin	-123.9	-109.2	-39.8	-16.1	-72.3
EBIT margin	-141.4	-124.2	-46.8	-21.0	-83.4
Pre-tax margin	-156.3	-136.8	-52.3	-24.8	-92.5
Net margin	-157.2	-137.4	-52.3	-24.8	-92.9
ROIC	-62.9	-81.1	-69.7	-45.7	-64.9
ROA	-26.5	-36.0	-39.9	-22.2	-31.1
ROE	-38.4	-79.3	-206.4	328.0	1.0

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	144	167	176	198	11.3%
Intangible fixed assets	10	10	10	10	-0.5%
Cash and equivalents	217	197	3	94	-24.4%
Total assets	576	646	495	621	2.5%
Short and long-term debt	38	165	162	392	117.3%
Other long-term liabilities	139	189	238	272	24.9%
Total liabilities	178	354	401	664	55.2%
Net debt/(funds)	0	1	47	4	187.5%
Shareholders' equity	399	293	96	(42)	NA
Change in working capital	(170)	(38)	9	2	NA
Operating cash flow	(128)	(221)	(173)	(115)	NA
Capital expenditure	177	124	35	50	-34.4%
Free cash flow	(143)	(295)	(215)	(163)	NA

Valuation and leverage metrics					Average
P/E (x)	NA	NA	NA	NA	NA
EV/EBITDA (x)	NA	NA	NA	NA	NA
FCF yield (%)	-0.43	-77.3	-52.9	-39.1	-53.2
Price/sales (x)	3.4	2.3	1.1	0.7	1.9
Price/BV (x)	0.8	1.3	4.2	- 9.9	- 0.9
Dividend yield (%)	0.0	0.0	0.0	0.0	0.0
Total debt/capital (%)	8.7	36.0	62.9	112.0	54.9

Selected operating metrics					CAGR
Total Product	73.8	151.9	366.2	543.7	94.6%
YoY Growth	-3.5%	105.7%	141.1%	48.5%	NA
Total Services	23.5	17.3	11.5	11.8	-20.4%
YoY Growth	61.6%	-26.5%	-33.6%	3.2%	NA
Product Gross Margins	-27.7%	-43.6%	-8.7%	5.8%	-159%
Service Gross Margins	12.8%	6.9%	15.0%	15.0%	5.4%

Source: Company data, Barclays Capital

Stock Rating	2-EQUAL WEIGHT
Sector View	2-NEUTRAL
Price (08-Nov-2011)	$ 3.16
Price Target	$ 4.00
Ticker	AONE

Investment case

Our 2-EW rating is predicated on near-term concerns on AONE's revenue ramp due to dependence on emerging OEMs, and the company's longer-term need to raise capital, balanced by valuation. Our $4 price target is based on a ~0.9x EV/Sales multiple on our CY13 sales estimate of $555M.

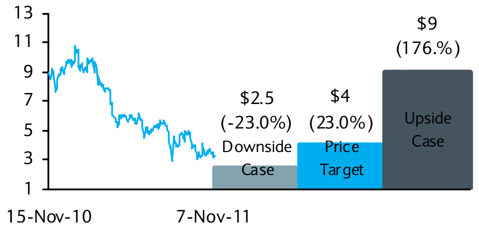
Upside case $ 9.00

Better than expected traction at current customers and ramping established OEMs could yield revenues closer to $1.0B in 2013. Assuming a stable multiple would yield an upside case closer to ~$9 a share.

Downside case $ 2.50

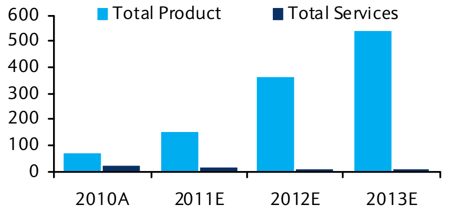
AONE's inability to hit near-term targets could render it unable to sustain its business operations in the mid-term. Given its IP, technology, we believe a sale would be required to monetize its assets. At ~0.8x its book value / share yields downside of $2.50.

Upside/downside scenarios



Source: FactSet

Total Product vs. Services Sales



Note: FY end Dec.

A123 SYSTEMS (AONE) – INITIATING COVERAGE AT 2-EW

We are initiating coverage on A123 with a 2-Equal Weight rating and $4 price target.

We initiate coverage of A123 Systems (AONE) with a 2-Equal Weight rating and $4 price target. With 20 development projects in the pipeline with both emerging (e.g., Smith Electric and Fisker) and established (e.g., GM, Daimler) automobile OEMs, we expect A123 to emerge as a key supplier of automotive battery systems for the xEV market. The company's proprietary Nanophosphate lithium-ion technology provides better conductivity and enables its systems to hold a charge for longer, making it a viable option for xEV deployments. Our 2-Equal Weight rating reflects our caution regarding near-term demand trends given dependence on emerging OEMs which can cause issues in the company's revenue trajectory (as highlighted by its recently reduced outlook for 4Q) and management's acknowledgment that in order to hit its strategic goals, the company will likely need an additional cash infusion in 2013.

Following investments made to increase its manufacturing capacity, our estimates call for rising utilization to support expected product launches and the emergence of gross profits. Our 2013 estimates factor in incremental traction with expected OEM launches. For 2012 and 2013 our sales and EPS estimates are $377.6 million/$(1.54) and $555.5 million/$(1.05) respectively. While management looks for the emergence of positive EBITDA in 2013, we take a more cautious view given the recent near-term reduction in revenue trajectory.

Our $4 price target is based on an 0.9x EV/sales multiple on our CY13 sales estimate of $555.5 million.

Company Description

A123 Systems is a designer, developer, and manufacturer of lithium-ion batteries and energy storage solutions.

Headquartered in Watertown, Massachusetts and incorporated in 2001, A123 is a designer, developer and manufacturer of lithium-ion (li-ion) batteries and energy storage solutions. The company's proprietary technology includes nanoscale materials licensed from MIT and is geared toward deriving performance improvements for traditional battery technology. Specifically, A123 leverages its proprietary Nanophosphate chemistry as the cathode material in a lithium-ion cell. The process is designed to provide a competitive advantage in the areas of power, safety, and life cycle — all major challenges in improving storage capabilities of current battery technologies.

The company's customers include traditional and emerging auto OEMs with 20 production programs in the market.

The company has partnerships across the transportation market working with a variety of electric vehicle applications including HEV, PHEV, and EVs along with the heavy-duty hybrid truck and bus market. Its customers include traditional automotive manufacturers such as GM, BMW, and Daimler as well as start-up providers such as Fisker and Smith Electric. A123 is part of 20 production programs for the xEV market. Moreover, the company provides utility companies and independent power producers (IPPs) grid storage solutions based on its battery technologies to support the rising contribution of renewables and help deal with challenges associated with intermittent energy generation.

A small portion of the company's revenues are derived from legacy consumer product contracts to provide batteries to companies such as Black & Decker and Procter & Gamble (i.e., Gillette). We believe its legacy business served primarily as a proof-of-concept opportunity rather than a future strategic focus for A123.

AONE – Investment Positives

A Leading Independent Developer of Battery Technologies

A123's leading technology continues to distinguish the company in the growing battery market. Its batteries are designed to offer higher usable energy allowing for increased battery utilization and lower cost, longer cycle life with dependable performance, as well as competitive safety and abuse tolerance. Its Nanophosphate technology provides long lasting lithium-ion batteries for the transportation, electric grid, and commercial end markets.

Growing Roster of OEM Partnerships

A123's goal is to emerge as the leading independent provider of battery systems for the xEV market. The company's growing customer relationships continue to differentiate A123 from its competitors. A123 initially defined itself through its successful partnership with Black & Decker in the commercial market and now has a growing list of OEMs that continue to validate its technology and manufacturing capabilities. A roster of well-known manufacturers such as BMW, GM, and Mercedes have chosen A123 as their battery supplier, as well as a number of start-ups such as Fisker and Smith Electric. In total, the company is involved in 20 production programs for the xEV market.

Cost Reduction Initiatives in Place

Now that the manufacturing plant is ramped, a material amount of needed investment is behind the company. The company has outlined a detailed roadmap to reduce cell cost by 50% in 4Q12. With its factories running at full capacity, higher utilization can be achieved allowing for significantly reduced costs. Management's current goals call for breakeven gross margins to emerge in 2012, with positive EBITDA margins in 2013.

AONE – Investment Risks

High Near-Term Customer Concentration

A considerable amount of A123's current revenue is generated from a small number of customers. In 2009 and 2010, BAE represented 35% and 28% of revenues, respectively, and AES accounted for 9% and 13% of revenue respectively. Although the company has multiple potential deals in the pipeline, including a recently announced production contract with GM to produce the Chevy Spark in 2013, we expect the company to rely on a few customers for the bulk of its revenues at least for the foreseeable future, subjecting A123's revenue to potential volatility around specific company sales. Many of these customers, such as Fisker and Smith Electric (which will both serve as material near-term contributions to A123's top line), are relatively new to the auto market and thus may heighten potential revenue and cost volatility.

The Need to Fund Capacity Increases

A123's ability to drive down the cost of its systems through ongoing technological improvements and expanded manufacturing scale is a core determinant of its longer-term success. Thus far, the company has yet to achieve profitability. We note that with the completion of the company's Livonia plant, AONE has made significant steps toward meeting its initial run rate goal of 760 MW hours of capacity as well as hitting its near-term target (YE11) of 660 MW hours. Management does expect to reach positive gross margin in 2012 and breakeven EBITDA in 2013. Based on our estimates, the company's cash balance of $ 225.8 million should allow the company to fund operations in the near term, but eventually A123 will most likely need an additional cash injection.

Reliance on Government Grants

We believe continued government support is essential in order to fund A123 Systems' research and operations as well as providing support for end market demand. Although the U.S. along with other governments has been very supportive thus far, many funding decisions are determined on an annual basis and changes in government policy or future budget restrictions could inhibit successful completion of existing projects. The risk of a loss in governmental support is further exacerbated during the current volatile economic landscape particularly given potential challenges on the success rate of current administration's prior initiatives. Currently, the company is in discussion for a $233 million DOE loan which it expects in 2013. If A123 is unable to secure the loan, it may need to tap the capital markets in order to procure the necessary funding in order to meet its internal production goals.

Competitive Scale Increasingly Important

Heavy competition exists in the battery industry, and many of the company's competitors are larger organizations that may have existing relationships with A123's target customers. Some of these competitors include established names such as Panasonic, Sanyo, LG Chem, and Johnson Controls. These competitors may also have greater financial, technical, and scaling capacity than A123. We do believe that the recent capacity increases by the company help to put it on better competitive footing, though execution will be key. In our view, the need for scale stresses the importance of solidifying relationships and continuing to differentiate products to remain competitive in the growing market and compete with larger brands.

Material Control Weakness

Within its 2010 Form 10K, A123 disclosed that it had discovered weaknesses associated with internal controls related to financial reporting. Earlier this year, the company's then CFO, Michael Rubino, resigned and was replaced by the company's current CFO, David Prystash. The company continues to work on improvements in it financial controls, though visibility on when the improvements will be complete is still limited.

AONE – Our View

Our investment thesis for A123 Systems has a two-part focus. Near term, the company's valuation of around 1x book value suggests limited expectations for management's ability to execute or its expectations for improving scale in order to meet its gross margin profitability goal at some point next year. Since the investment in its factory is already complete and its facilities are up and running, this suggests that investor skepticism lays with its ramp expectations for its unit shipments. As we expect near-term shipments (over the next six months or so) to largely be for Smith Electric and Fisker — both start-up operations — we can understand where skepticism originates from. We would note, however, that our checks suggest that Smith Electric's demand remains healthy, while A123's own internal expectations for Fisker (which has commenced shipping its Karma sedan) are much lower than the OEM's.

Longer term, an investment in A123's stock seems to be an investment in the overall EV market. Undoubtedly, the company has been gaining share as an independent battery provider to various OEMs with wins at Smith, Navistar, BAE Systems, Daimler, Delphi, Magna, Mercedes Benz, among others. However, we recognize that initial demand trends, particularly in the lower end, have not been overly enthusiastic. Moreover, given current build expectations, there is a potential of over-capacity in the battery market. A123's own funding needs may work against the company as it remains dependent on additional funding in the 2013 time frame (from government or other sources).

Figure 52: A123 Systems (AONE) Investment Framework

Potential for Share Gains	◑	- With more than 20 development projects in the works, A123 seems poised to gain share in the market, though clearly off of a low base. - Near-term success will depend on emerging vendors (e.g., Fisker and Smith Electric) as they make up a large percent of current revenues while longer-term success will depend on more established OEMs (e.g., GM).
Likelihood of Margin Expansion	◑	- The investments necessary to improve A123's gross margin are now largely behind the company (i.e., factory build out). - Though margin improvement will be dependent on volume growth, we believe the company is now in a much better position to improve its gross margin structure.
Barriers to Entry	◑	- We believe A123's Nanophosphate technology provides a high barrier to entry in terms of better storage and high density. - Costs will ultimately prove to be a differentiator, though the company's goal of reducing cell costs by 4Q12 is a step in the right direction, in our view.
Capitalization	○	- Though A123 has enough capital to operate in the near term, our concern centers around its prospects in 2013 when it expects an additional cost infusion from the DOE. - The company should have other means to do so if the DOE loan falls through, but we are concerned given that AONE is the only company in our coverage universe whose plans call for a capital injection.
Risk Profile	○	- We believe AONE has a high risk profile relative to our coverage universe as its near-term trajectory is dependent on sales of automobiles by emerging vendors, while the ability to achieve its longer-term strategy is dependent on an additional cash injection.
Valuation	◑	- Given A123 does not generate gross profits currently, we have limited comparative valuation metrics to utilize. - On an EV/sales and price-to-book basis, AONE is trading at all-time lows, and thus any improved execution by the company could yield some upside.

Source: Barclays Capital

A123 – Background

At the core of A123's offering is its Nanophosphate technology which provides comparatively better durability, high power density and high abuse tolerance.

Founded in 2001, and headquartered in Waltham, Massachusetts, A123 Systems, Inc. designs rechargeable lithium-ion batteries and battery systems. The company's product offerings include a range of batteries in various sizes and forms, as well as packaged modules and fully-tested battery systems. At the core of its product offering is A123's Nanophosphate technology which is designed to provide a battery with comparatively better durability, high power density, and high abuse tolerance for greater safety performances and a longer life. The "nano" in Nanophosphate technology refers to the size of the particles in their caps, which are about 50x smaller than a typical competitor, allowing for much higher surface area. This larger surface area increases power and usable energy, useful to customers with high power–demanding applications such as hybrid vehicles. The chemistry also increases safety and avoids pack-level propagation. With the lithium Nanophosphate technology, a single cell failing will not necessarily propagate, reducing the risk an entire pack will fail. Lastly, with a higher surface area, the technology allows for stable voltage and power over a wider state of charge range. AONE is able to reach a higher dollar per usable kWh rate, while many competitive products can burden automotive OEMs with extra mass and unusable hardware.

A123's first commercial products served as a proof of concept for its technology.

At its inception, A123 began using its technology to focus on developing and supplying batteries for commercial products such as power tools. However, management knew this was not the final strategic goal of the company, but rather served as a proof-of-concept for its technology. Targeting larger opportunities, management continued to invest in its Nanophosphate technology, developing a prismatic cell to optimize space utilization and allowing AONE to become a key supplier in the emerging electric vehicle market. Given questions on the future trajectory of oil prices and governments' focus on improving environmental standards, management believes A123 is at the cusp of emerging as a key supplier in a potentially disruptive shift in the automotive market.

The company now has roughly 20 development plans with established and emerging auto OEMs in place.

Given the nascent status of the EV industry, A123 has grappled with timing delays of products from key customers while simultaneously continuing to drive increased manufacturing capacity necessary to lower the costs of its battery systems. This has led to a push-out of its anticipated revenue ramp while costs continued to escalate as the company needed to hold to its capacity expansion plans. While A123 continues to work with several notable OEM suppliers in the automotive industry (GM, BAE Systems, BMW, Daimler, Shanghai Automotive Industry Corp.) as well as upstarts such as Fisker, we believe timing and execution are the key element of A123's story. In other words, the key question is whether the company benefits from an improved revenue trajectory which can then allow A123 to continue to invest in the business in order to drive down costs and ultimately spur broader acceptance of its product suite.

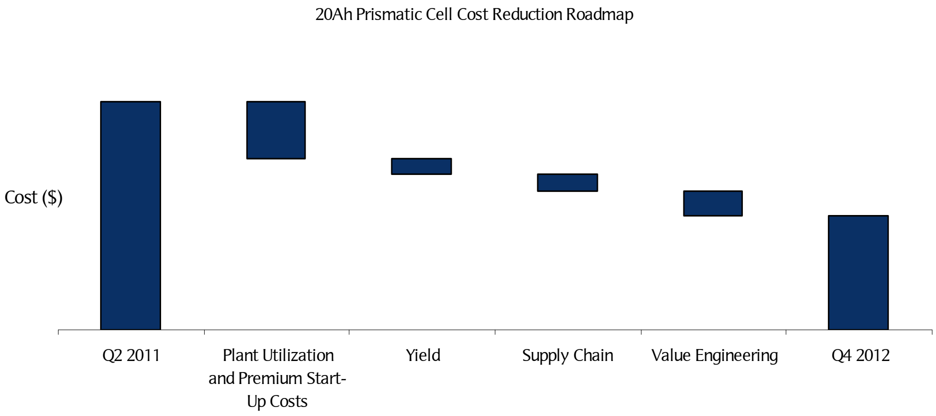
A123's capitalization remains stable for the near term; by 2013 the company will need additional capital according to its own internal plans.

Currently the company's cash position stands at $225.8 million supported by its August 5, 2009 DOE grant of $249 million, April 14, 2009 award of $100 million in Refundable Tax Credits from the state of Michigan, and IPO and follow-on proceeds of $391 million. The company is also in the final stages of securing a DOE ATVM loan of $233 million which would most likely not be required until 2013 if it is able to hit its expansion plans. In terms of manufacturing capacities, we learned from the 2Q11 earnings call that the company expects capabilities to be up to 660 MW hours at the end of 2011, from 350 MW hours at the end of 2010. This capacity level supports an annualized revenue run rate of $400-$450 million. When fully operational, AONE expects capacity to exceed 760 MW hours. The company has outlined a cell cost reduction roadmap and expects costs to decrease by approximately 50% in 4Q12 allowing for overall blended gross margins of 25% from the three core businesses.

A123's Product Portfolio

A123's proprietary technology alters the basic composition of a lithium-ion battery in order to improve its conductivity and enable it to hold a charge for a longer period of time. AONE's batteries are based on lithium-ion phosphate chemistry, commonly used in power tools and EVs. The company then alters the basic composition using a proprietary process (Nanophosphate) to improve its conductivity and enable the battery to hold a charge for an extended period of time. Comparatively, because AONE's batteries are based on iron and phosphorous, they should provide lower cost versus higher raw materials based technologies (i.e., nickel and cobalt). Management's current goal is to reduce its cell cost by 50% by the end of 4Q12.

Figure 53: A123 Cell Cost Reduction Plans



Source: A123 Systems, Company Presentation

Originally the company used a cylindrical cell design. The 26650 was AONE's first battery, with 10x the power and life of a standard Li-ion battery. This cylindrical battery allowed cordless power tools to deliver even more power than its corded equivalents. However, the cylindrical cells were not optimized for space, and thus the company has transitioned to a prismatic cell for premium power density applications. The 20Ah Prismatic is AONE's newest cell providing industry leading usable energy and cycle life. In addition to higher energy density, the volume-efficient design can be shaped according to specific requirements of an application, specifically used for PHEV and Extended Range EV applications.

Figure 54: A123 Products

26650	32113	F18700	20Ah Prismatic
10x power, 10x life over standard Li-ion	High power and long life under demanding duty cycles	100x power of conventional Li-ion technology, low impedance packaging	Industry leading usable energy & cycle life

Source: A123 Systems, Company Presentations

Transportation is the company's largest division representing roughly 60% of revenues.

Transportation is the company's largest division (roughly 60 % of revenues), where it works with tier-1 suppliers to develop batteries for hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs) and electric vehicles (EVs), both passenger and commercial. A123's diverse customer base includes clients such as Daimler, Delphi, Fisker, Magna, Navistar, Smith, and Mercedes. Recent contracts include shipments of battery packs to Fisker for its Karma PHEV, as well as shipments of modules for its Shanghai automotive hybrid vehicle and starter batteries, or "stop-start" batteries. AONE's 12V Engine Start

Battery uses this stop-start technology, which can increase fuel efficiency while lowering operating costs. Compared to lead-acid AGM batteries, the Li-ion batteries offer better charge acceptance allowing greater fuel economy, lighter weight (about 50% less than comparable lead-acid batteries), and significantly longer life. This change could be an integral part in helping the auto industry meet President Obama's new fuel efficiency mandates. In addition to these current contracts, the company also has a number of well known customers with developments in the pipeline including GM, BMW, VW, Porsche, and Ferrari.

The company also supplies batteries for electric grid services (roughly 30% of sales) to provide utility grade energy storage solutions.

In addition to transportation, A123 also supplies batteries in the electric grid services market, which makes up roughly 30% of the business. Here the company uses its patented technology to deliver energy storage solutions allowing for reduced emissions, higher product efficiency, and lower operating costs. A123 expects to have deployed more than 10 installations across four continents by the end of 2011, totalling more than 100 megawatts of its energy storage solutions.

Figure 55: Grid Storage Solutions

Source: A123 Systems

While representing approximately 10% of sales, we do not consider A123's commercial business strategic to its long-term growth outlook.

A123's smallest market is its commercial applications business (roughly 10%), providing high power batteries that can be found in applications such as power tools, medical systems, telecom and IT infrastructure. Similar to its advantages in the previously discussed end markets, here A123's Lithium-ion batteries offer higher energy, lighter weight, and longer life cycles than its Lead Acid counterparts. Current development and production programs represent roughly $100 million in customer stated demand in 2013.

Management Team

Strong technical expertise is the cornerstone of A123's management team, as a number of the company's co-founders are still actively involved with the organization including Dr. Yet-Ming Chiang, and Dr. Gilbert Riley. Broadly, management's experience originates from the automotive and/or energy storage/power arena.

- **David Vieau:** Mr. Vieau has served as A123's President and CEO along with a director on the company's board since March 2002. Concurrently, Mr. Vieau has served as a director of Avocent Corp., an information technology infrastructure management company, from 2001 to December 2009. Mr. Vieau holds a B.S. in Mechanical Engineering from Syracuse University.

- **Dr. Yet-Ming Chiang:** Dr. Chiang, is a co-founder and board member for A123. He currently serves as a full professor in the materials science and engineering department at MIT focusing on the design and synthesis of advanced materials as well as the development of new devices enabled by material advances, including new energy storage and mechanical actuator technologies. Prior to founding A123, Dr. Chiang co-founded American Superconductor.
- **David Prystash:** Mr. Prystash joined A123 in May 2011 and serves as the company's CFO. Prior to joining A123, Mr. Prystash served as the CFO for NewPage Corp., a North American coated paper manufacturer since September 2008. His previous experience includes more than 20 years at Ford Motor Co., where he held a variety of senior financial and operational leadership positions including serving as CFO of Ford's global product development and purchasing and an executive director of Ford's Pre-Owned and Vehicle Remarketing.
- **Dr. Gilbert (Bart) Riley Jr.:** Mr. Riley is a co-founder of A123 and has served as the company's CTO and Vice President of Research as well as a director since October 2001. Prior to co-founding A123 Systems, Dr. Riley held a number of development and management positions over an 11-year period at American Superconductor. In his most recent role, he served as senior manager in corporate engineering. Dr. Riley holds more than 40 patents and has published more than 80 papers in the field of advanced materials.
- **Jason Forcier:** Mr. Forcier has served as A123's Vice President, Automotive Solutions Group since August 2009. From August 2008 to August 2009, Mr. Forcier served as Vice President and General Manager for Lear Corp. Prior to his role at Lear, Mr. Forcier worked at Robert Bosch LLC, a supplier of automobile components, from 1997 through 2008 in various management positions in the United States and Europe.
- **Robert Johnson:** Mr. Johnson has served as A123's Vice President and General Manager of the company's Energy Solutions Group since January 2008. From February 2007 to January 2008, Mr. Johnson served as Senior Vice President, President North America of APC-MGE Systems, a business unit of Schneider Electric. From February 1997 to February 2007, Mr. Johnson served in various roles at American Power Conversion Corp., including President/CEO and Vice President of APC's Availability Enhancement Group.

Outlook and Estimates

We initiate coverage on A123 Systems with a 2-Equal Weight rating and $4 price target.

A Stable Capital Structure – For Now

A123 has a stable capital structure at the moment, as its capital allocation plans are supported by its $249.1 million DOE grant awarded in December 2009 to support expansion of new lithium-ion battery manufacturing facilities in Michigan. The agreement provides a matching contribution for 50% of qualified expenditures. The company has $126 million remaining from the DOE grant and plans to rely on this liquidity to fund operations until at least 2013.

In total, the company has cash and cash equivalents of $225.8 million and total debt of $145.9 million, yielding a net cash position of $79.9 million. Based on our estimates which factor in reduced cash burn over the next few quarters, as well as IHI's $32.5 million investment, the company has sufficient cash reserves in order to meet its capital requirements for the next few quarters. Our comfort on a reduced cash burn is supported by the fact that a material amount of investment in expanding the company's capacity is already behind the company. However we recognize that potential adjustments to its top line trajectory – as highlighted during its recent 3Q earnings results – can provide a material swing in its cash burn. Beyond that, management has in the past noted that it is currently in discussions to obtain an additional loan under the DOE's Advanced Technology Vehicles Manufacturing Loan Program to support further expansion in the amount of $233 million. The company recognizes the risks associated with receiving the DOE loan and noted that they are open to other opportunities (such as the capital investment by IHI in 3Q) in order to continue to meet their strategic plan.

In our view, dependence on a future government grant or alternative means for capital injection in order to support the business model is certainly not ideal, particularly given the current economic environment, and thus we consider successful procurement of the grant critical toward supporting A123's business going forward. Moreover, if the company is unable to make material progress toward reducing its losses, capital constraints are likely to accelerate in coming quarters.

Outlook and Guidance

During the company's recent analyst day, management provided a comprehensive outlook for its strategic focus on driving toward profitability. Largely driven by its strategic focus on reducing costs at the cell level (roughly 70% of the company's cost of goods) by approximately 50%, management believes it is well positioned to achieve positive gross margin at some point in 2012 and positive EBITDA in 2013. Specifically, we note that cell reduction costs are not dependent on "invention" but rather: 1) better utilization, and 2) component supplier cost reductions. Based on management's strategy, the company expects roughly half of the improvements to be generated by improving capacity utilization and reducing production start-up costs. The company estimates that better yields should provide another 10-15% cost improvement with the rest coming from improved scale to drive down component costs. Since its preannouncement management has indicated it has made significant progress in its cell cost reduction goal, although the recently announced decrease in Fisker's 4Q orders due to the company's rebalancing of inventory levels for the Karma will likely lower plant utilization and delay these cost reduction efforts. This setback further supports our view on near-term volatility due to dependence on emerging market OEMs.

In response to the unexpected Fisker cutback, the company has reduced its 2011 revenue guidance to a range of $165-$180 million from its previous guidance range of $210-$225 million. Despite this adjustment, A123 still believes it is well positioned to achieve breakeven quarterly gross margin within 2012, followed by breakeven adjusted EBITDA in 2013. The company will continue to focus on reducing costs and expanding its strategic partnerships in order to increase liquidity.

Estimates and Valuation

We establish CY12 and CY13 sales estimates of $377.6 million and $555.5 million respectively. Broadly, we expect continued ramp in the company's capacity in order to service its growing list of customers (i.e., Smith Electric, GM and Fisker), particularly as its current roster of 20 development deals selectively begin to ramp. From a cost-reduction perspective, our estimates factor in ongoing cell reduction costs broadly in line with management's expectations, along with improved overhead absorption and steady increase in utilization through 2013. We look for A123 to achieve gross profits in 2H12, though our expectations for positive EBITDA (beyond 2013) are more cautious than management's current expectations. Our CY12 and CY13 EPS estimates are $(1.54) and $(1.05), respectively. We establish a price target of $4, or an EV/sales multiple of approximately 0.9x our CY13 sales estimate of $555.5 million.

In our view, the key risks to our estimates remain 1H12, largely due to A123's dependence on shipments from emerging vendors (e.g., Smith Electric and Fisker) ahead of shipments from more established OEMs in 2H12. While we believe management has adjusted for a more conservative view on its build expectations (vs. Fisker's shipment expectations for example), some risk remains in the near term, nonetheless. Moreover, A123's strategy continues to be dependent on an additional cash injection in 2013 (which we have factored into our estimates). Given the tenor of discussion in Washington and the review of the DOE loan program, in our view the ability for A123 to secure DOE financing has become increasingly more difficult in the last few months, and thus the company may be required to seek alternative means to raise capital in order to hit its internal plans.

ENERGY EFFICIENCY SOLUTIONS I: ENERGY SERVICE COMPANIES (ESCOS)

Key Trends

A Significant Market Opportunity

We view the broader energy efficiency solutions market as one of the larger opportunities in clean technology. Residential and commercial energy use represents north of 40% of domestic energy demand. We believe this provides a fertile backdrop for both point and comprehensive solutions that provide means to optimize energy utilization.

Variety of Factors Support a Growing Industry

The combination of aging infrastructure and higher energy costs over the long term coupled with budgetary constraints provides a supportive backdrop for growth in the energy efficiency solutions market, particularly within the energy service company (ESCO) business model whereby third-party financing and budget-neutral solutions provide zero up-front cost to the customer. In addition to cost reduction needs, energy efficiency solutions also provide the means to achieve mandated targets such as increased renewable energy usage and reductions in carbon/greenhouse gas emissions.

Ongoing Regulatory Support

Legislation is not subject to congressional appropriations, which should mean longer-term support for the market.

In the U.S. market, prior and current federal administrations, along with state and local governments, have taken the lead in driving down energy utilization through supportive legislation. Examples at the federal level include the Energy Policy Act of 1992, Energy Policy Act of 2005, the Energy Independence and Security Act of 2007, as well as an executive order issued by the current administration that all federal agencies must reduce their petroleum consumption by 30% from 2005 levels, water consumption by 26% from 2006 levels, and, beginning in 2020, all new federal buildings are to achieve zero-net-energy use by 2030. We note that legislation is not subject to congressional appropriations and thus at the federal level, should provide longer-term support for the market.

Key Challenges

A Highly Fragmented Market

The broader energy efficiency market is highly fragmented with a broad array of suppliers and strategies tapping into providing energy efficiency solutions. Suppliers include product-based vendors, utility affiliated suppliers, and independent solutions firms. This makes the selection of public investment opportunities in order to capitalize on the broader trend fairly limited.

Rising Risk Profile for MUSH Markets

MUSH (i.e., municipalities, universities, schools and hospitals) markets are increasingly under budgetary pressure given the current economic backdrop. While the ESCO business model provides budget-neutral solutions to drive infrastructure improvements, potential conversion times in transitioning contract awards to actual contracts may be extended, impacting market growth.

Energy Efficiency Solutions: Doing More with Less

We consider the broader energy efficiency industry one of the largest opportunities in the clean technology market.

We view the broader energy efficiency industry as one of the largest opportunities in the clean technology market. We define energy efficiency as comprehensive energy solutions that enable various entities (e.g., municipalities, schools, enterprises, universities) to optimize energy consumption in order to reduce energy-related costs. A fairly broad category, energy efficiency solutions encompass using technologies from some of the other sub-markets that we have identified in the clean technology arena (e.g., lighting, renewable energy, building management upgrades). Although we view it as a substantial opportunity, targeting public equity opportunities that target trends in the broader energy efficiency solutions market is difficult, however, because of its broad scope.

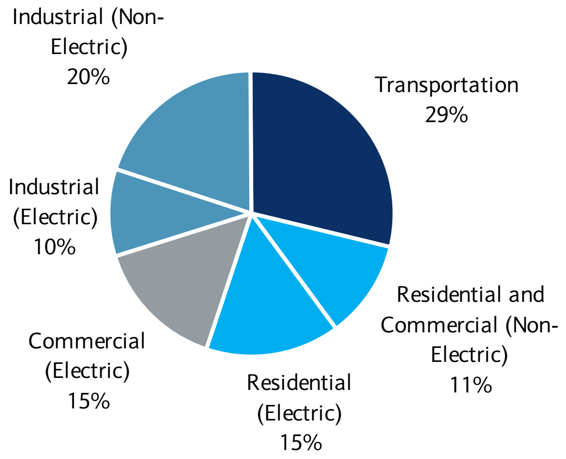
Energy efficiency is the low-hanging fruit in targeting opportunities to optimize energy utilization, lower energy costs, and achieve broader regulatory goals.

We believe energy efficiency solutions can be considered the low-hanging fruit in targeting opportunities to optimize energy utilization, lower energy costs, and achieve broader regulatory goals such as a reduction in carbon emissions/greenhouse gases. A number of factors are driving support for improved energy efficiency, including budgetary constraints (i.e., doing more with less), the long-term trend toward higher energy prices, and aging infrastructure. Other goals such as carbon footprint reduction and increased awareness of energy consumption are also likely to play a role in deploying energy efficiency solutions, though we believe the primary driver supporting growth will be the need to reduce costs.

Residential and commercial energy usage is one of the largest areas for potential savings in energy reduction.

Although there is a lot of focus on the reduction of energy in other areas of consumption — by automobiles, for example — we believe residential and commercial energy usage is one of the largest areas for potential savings. Residential and commercial energy use accounts for as much as 40% of the primary energy usage in the United States (Figure 56) and as much as 40-70% of greenhouse gases emitted in developed cities. This signifies potential material opportunities for savings.

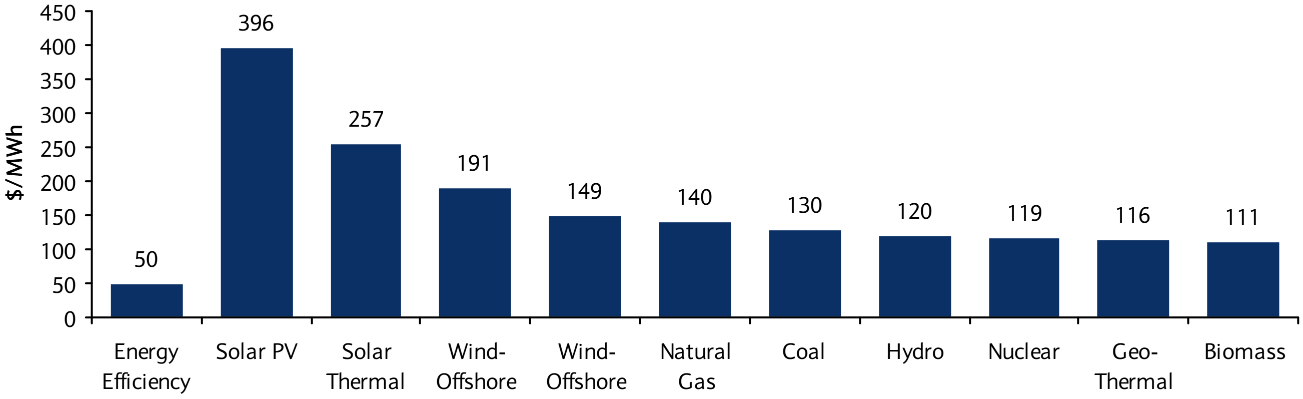
Figure 56: U.S. Energy Demand by Segment



Source: EIA Annual Energy Review, 2011

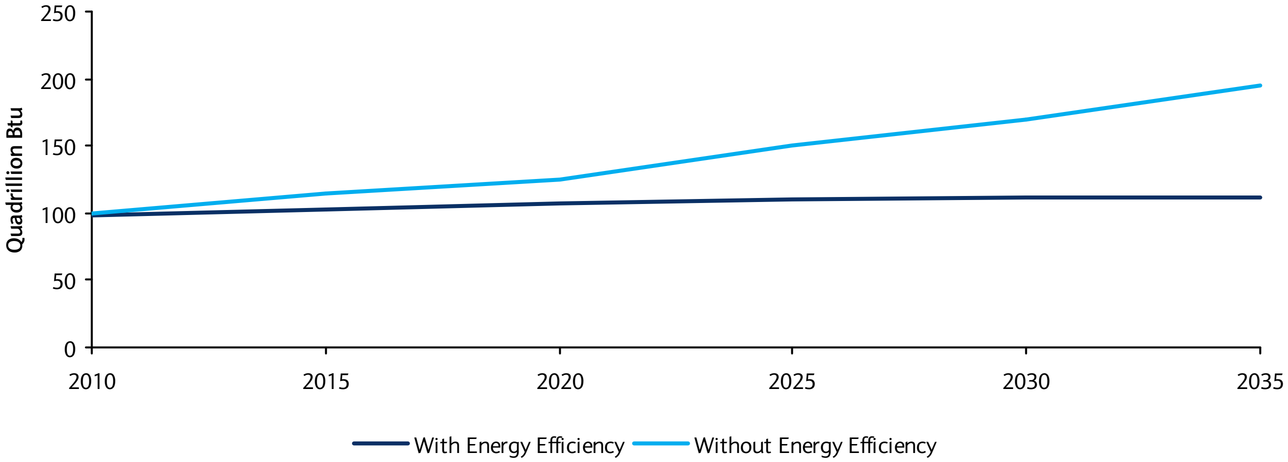
Moreover, the relative cost for energy efficiency initiatives is materially lower than other means of energy generation/reduction and could provide significant savings over the longer term.

Figure 57: Levelized Cost of New Generating Technologies in 2016E



Source: Institute for Energy Research, National Action Plan for Energy Efficiency

Figure 58: Rising Energy Demand



Source: EIA Annual Energy Outlook, 2011

Solutions can range from installing energy efficient lighting, increasing an organization's use of renewable energy, infrastructure upgrades and construction and design of energy efficient buildings.

Tailored to a specific organization's needs, a comprehensive energy solution could include a number of initiatives including the implementation of various projects which address energy conservation, power generation, and types of energy sources used, as well as various risk management solutions. Solutions can range from installing energy-efficient lighting, increasing an organization's use of renewable energy, infrastructure upgrades to heating, ventilation, and air conditioning systems (HVAC), and the construction and design of energy-efficient buildings. Given the potential for rising energy costs over the mid- to longer term, we expect broader energy efficiency initiatives to garner increased momentum over time.

The flip side of the energy efficiency market is that a healthy amount of upfront expenditure is often required to install and upgrade systems necessary to drive down costs over a longer payback period. These upfront costs can be material and thus need to be taken into account as well as financed as organizations look to implement various strategies to lower total energy costs.

Service Provider Landscape

Several groups of vendors/ service providers focus on providing energy efficiency solutions to the end market.

Defining players in the energy efficiency market is challenging as the definition of energy efficiency solutions is fairly broad and can encompass multiple technologies and services. We thus focus on vendors that provide comprehensive energy solutions rather than point technologies with a focus on specific areas of improvement. In our view, there are three primary categories of vendors that compete in the energy-efficiency solutions market.

1. Product Companies

Product companies' primary purpose is to use the promise of energy efficiency to sell their products. For example, this could include an LED systems provider that is looking to provide a scaled upgrade of a facilities lighting infrastructure to reduce lighting costs. These suppliers aren't necessarily looking to provide a multi-faceted or holistic approach to energy efficiency, but rather to sell a specific method by which to improve energy usage with the goal of selling their products.

2. Utilities Providers

Utility companies (or divisions of utility companies) often look to leverage pre-existing relationships and well-known brands to drive for-profit energy efficiency businesses. As most utilities are regulated at the state and/or local level, they typically offer energy-efficiency solutions to either meet energy efficiency goals set by various regulatory bodies or curry favor in order to allow for rate increases to support capital improvements, adjust for higher operating costs, and so on.

3. Energy Service Companies

ESCOs are independent organizations that provide similar services but are not linked to a utility. They focus on providing comprehensive solutions to third-party organizations (e.g., municipalities, schools, enterprises, universities) to reduce energy use. Typically they are paid based on the savings level achieved. They also can, at times, and in deregulated markets that support energy competition, supply customers with energy that they either create or buy from others.

Figure 59: Energy Efficiency Landscape

Category	Description	Major Participants
Product Companies	Individual vendors utilizing energy efficiency as a means to provide a market for their products	Honeywell, Carrier (NORESCO), Johnson Controls
Utilities Providers	Leverage pre-existing relationships/brand to provide services either for profit or to meet a variety of regulatory requirements	ConEdison, Constellation, FPL Energy Services, Pepco Energy Services
ESCOs	Energy service companies that focus on performance-based contracts	Ameresco, Chevron Energy Services, Clark Energy Group, SAIC, McKinstry

Source: Company and Industry reports, Greenbiz.com

Assessing the Opportunity for ESCOs

What is an Energy Service Company?

An ESCO is a business that provides a broad range of comprehensive energy solutions which are designed and implemented to improve and optimize energy utilization and reduce overall energy costs

An ESCO or energy service company is a business that provides a broad range of comprehensive energy solutions which are designed and implemented to improve and optimize energy utilization and reduce overall energy costs. The company assesses, develops, arranges financing, and maintains projects designed to improve energy efficiency and maintenance costs for facilities over a multi-year period. They serve as project developers and assume the technical and performance risk associated with a specific project.

Services provided by ESCOs include the development, design, and arrangement of financing for energy efficiency projects; the installation and maintenance of energy efficiency equipment; the measurement, monitoring and verification of the project's savings; and the assumption of risk that the project will save the amount of energy guaranteed. These services can be provided by a variety of means, including efficient lighting, high efficiency HVAC systems, increased usage of renewable energy, and centralized energy management systems.

Figure 60: Examples of Select ESCO Contracts

Customer	ESCO	Challenge	Outcome
FDA	Honeywell	• Cost reduction of energy required to manage a new FDA campus in White Oak, Maryland	• Combined heat and power plant using ESPCs • Plant buildout staged to match the multi-year campus development • The $71mn installed system cost is expected to save $5.8mn in annual energy cost and $6.5mn in annual reduced operations and management cost.
U.S. Navy	NORESCO	• Energy reduction at U.S. Naval station, Guantanamo Bay, Cuba	• $12mn wind turbine project to supply a quarter of the peak power needed for base operations • Saves $1.2mn in annual energy costs, along with 650K gallons of diesel, and reduces air pollution by 26 tons of sulfur dioxide, and 15 tons of nitrogen oxide.
DOE	Ameresco	• The DOE's Savannah River Site (SRS) was experiencing challenges maintaining their 1950s-vintage boilers • Unable to meet the requirements of the Clean Air Act and other mandated improvements in energy efficiency and increased use of renewable energy.	• Construction of a biomass-fuel steam co-generation plant and two smaller biomass-fueled plants. • Energy savings will start at $35mn annually.

Source: U.S. Department of Energy. ESPCs = energy savings performance contracts

According to the National Association of Energy Service Companies (NAESCO) there are approximately 30 ESCOs in the United States, though market share is highly concentrated among the top ten players, with a combined share of roughly 85%. We expect consolidation to continue as the ability to meet performance-based guarantees and balance sheet flexibility will continue to serve as competitive differentiators in the market.

Performance-Based Contracts a Differentiator

Performance-based contracts enable a customer to benefit from the necessary efficiency upgrades without having to bear the burden of the upfront costs.

The primary difference between ESCOs and other firms that provide comprehensive energy efficiency solutions (e.g., consulting organizations or some utilities) is that ESCO contracts are structured to be performance based. An ESCO's revenues from a specific contract (and often the financing associated with the contract) are tied to its ability to meet the targets for the amount of energy saved. The goal of the contract is to ensure that the investment made is budget neutral; i.e., the cost of the project is paid for by the cost savings generated over a specified period of time (generally five, to as long as 20, years). Once the specified payback period is complete, the full cost savings generated by the implementation of the new system/technology accrue to the customer.

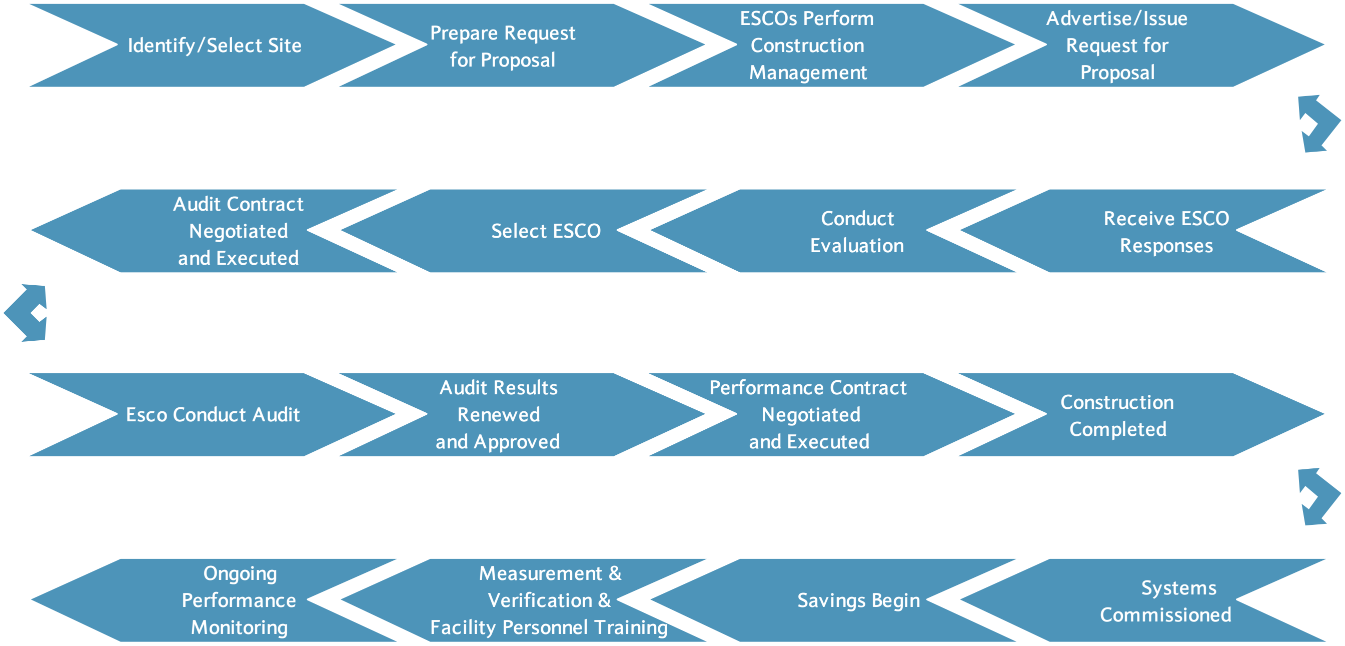
Energy-efficiency solutions provided by ESCOs often call for significant capital investments up front with a multi-year expected payback period. Therefore, any debt or financing utilized is paid for by the difference in energy costs pre- and post-installation of the new system. Project capital is often provided by a variety of sources, including bank loans, bonds, leases, utility incentives, and utility or public revolving loan funds. It is thus critical for ESCOs to verify (not just estimate) the energy savings gained from the installation of the new system. Moreover, because pricing for the contract is generally set based on an estimated level of cost savings, ESCOs need to ensure that whatever specific metrics agreed upon are achieved. In other words, an ESCO only makes money if it performs as promised and delivers the cost savings it is contractually required to achieve.

In addition to designing and implementing a system in order to drive improved energy efficiency, most ESCO contracts include the maintenance of all or some part of the newly installed high-energy equipment over the life of the contract. In general, when structuring the terms of a contract, the cost associated with the ongoing maintenance is bundled into the total cost of the project. Therefore, during the duration of the deal, the contract is designed to provide the customer the benefit of lower maintenance costs in addition to a reduction in energy costs.

Lengthy Procurement Process; Though High Visibility Once Awarded

The procurement process for an energy performance contract usually takes an extended period of time. Initial procurement can take anywhere from 12 to 18 months, followed by the construction period which can take one to two years to complete. This is then followed by the execution phase which can be as little as five years to longer than 20 years. However, once the procurement process is complete, the service provider has very strong visibility on the pipeline of revenues over the course of the contract.

Figure 61: ESCO Procurement Process


Identify/Select Site
Prepare Request for Proposal
ESCOs Perform Construction Management
Advertise/Issue Request for Proposal
Receive ESCO Responses
Conduct Evaluation
Select ESCO
Audit Contract Negotiated and Executed
Esco Conduct Audit
Audit Results Renewed and Approved
Performance Contract Negotiated and Executed
Construction Completed
Systems Commissioned
Savings Begin
Measurement & Verification & Facility Personnel Training
Ongoing Performance Monitoring

Source: Frost and Sullivan

Market Drivers

Long-term owners, single-tenant, owner-occupied facilities are the best positioned for ESCO contracts.

Government and government-related agencies, schools, and hospitals are the ideal candidates for ESCO contracts, and thus contribute a majority of domestic revenues. In general, these buildings are long-term owners, single tenant, and owner occupied. From time to time, these tenants have limited access to capital (due to various appropriations and budgetary constraints) thus making government agencies, municipalities, universities and hospitals the ideal candidates for long-term ESCO contracts. The commercial and industrial sector, however, still doesn't lend itself to the ESCO model. In the private sector, building owners are often looking for low-cost/no-cost operating improvements or a shorter duration for payback on a project (like upgrading a lighting system) rather than the comprehensive solutions targeted by ESCOs. Moreover, while lenders are willing to provide financing for ESCO projects related to federal and MUSH markets (largely due to the combination of a long-term tenant, good credit rating, and a performance guarantee by the ESCO), similar interest in funding commercial upgrades may or may not be done at interest rates that are as attractive.

MUSH markets (municipalities, universities, schools and hospitals) are therefore ideal targets for the ESCO market, representing north of 50% of the demand for services in the US.

A large portion of the ESCO market is driven by demand from the MUSH markets (municipalities, universities, schools and hospitals) which make up well north of 50% of the market. Approximately 20-25% of the market is driven by federal spending associated with regulatory requirements to drive down energy costs across various agencies. The remainder of the market is made up of commercial and industrial initiatives, utility residential programs, and the public housing market.

MUSH Markets: Budget Neutral Options Attractive

The municipality, university, schools, and hospital market represents the majority of ESCO related spending in the United States, contributing more than 50% to overall market revenues in the range of $3-$3.5 billion a year. Driven by the need to address similar issues such as aging infrastructure and budgetary constraints, organizations within these markets often turn to ESCOs in order to provide upgrades simply because there is often limited incremental funding within budgets in order to support these needs as they arise.

The challenges to implementing and effectively carrying out contracts are bureaucratic hurdles at the state and local level. Local laws often govern how a public entity can acquire a project. Moreover, GSAs (general service administrations) at the state and local level often have policies in place for how to upgrade and service municipal buildings. In some cases, select state budget processes do allow for performance contracting. Therefore, for an ESCO to be successful nationwide, it really needs local knowledge and the ability to win local approvals in order to capitalize on the largest spending segment within the market.

Federal: ESPCs Provide Healthy Opportunity for Expansion

Federally mandated performance-based contracts to reduce energy consumption provide a supportive backdrop for the ESCO market.

Under the Energy Policy Act of 1992, federal agencies were authorized to use private sector financing to implement energy conservation methods and energy efficiency technologies in order to invest in cost-effective energy conservation measures in existing federal buildings. ESPCs (energy savings performance contracts) were authorized by Congress as an alternative financing mechanism to accelerate the achievement of these cost reduction initiatives. Effectively, an ESPC is a partnership between a federal agency and an ESCO. Similar to any ESCO performance-based contract, an ESCO conducts an energy audit of a specific federal facility and identifies any improvements required to save energy. The ESCO then designs a project that meets the agency's specific energy reduction goals and arranges financing. The ESCO guarantees that any implemented improvements will generate the necessary savings that can cover the cost of the project over the term of the contract. After the completion of the contract — a period that cannot exceed 25 years — any additional cost savings accrue to the specific agency.

Approximately $80 billion worth of energy-savings projects are available from the federal ESPC program.

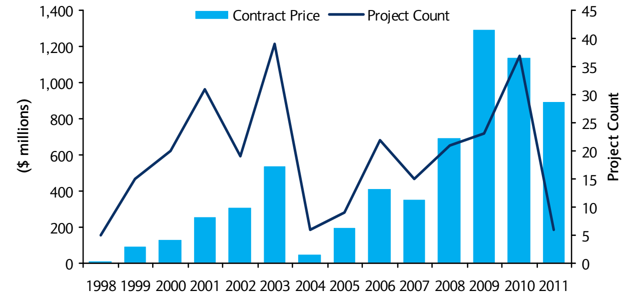
Regulated by the Federal Energy Management Program under the U.S. DOE, the use of ESPCs by federal agencies was reauthorized in the Energy Policy Act of 2005 and permanently reauthorized in the Energy Independence and Security Act of 2007. In December 2008, 16 firms were awarded IDIQ (indefinite delivery/indefinite quality) contracts for up to $5 billion each for total potential energy-savings projects worth $80 billion.

Figure 62: Designated IDIQ Award Recipients

Company	Competitive Category
Ameresco	Independent
Chevron Energy Solutions	Independent
Clark Energy Group	Independent
ConEdison	Utility Affiliation
Constellation Energy Projects and Services	Utility Affiliation
ConEdison	Utility Affiliation
FPL Energy Services	Utility Affiliation
Honeywell Building Solutions SES	Product Company
Johnson Controls Government Systems	Product Company
Lockheed Martin Services	Independent
McKinstry Essention	Independent
NORESCO (Carrier)	Product Company
Pepco Energy Services	Utility Affiliation
SAIC Energy, Environment and Infrastructure	Independent
Schneider Electric Buildings	Product Company
Siemens Government Services	Product Company
Trane U.S.	Product Company

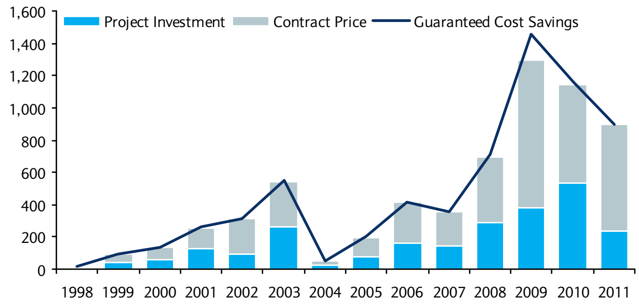
Source: U.S. Department of Energy

Figure 63: Project Count and Contract Price



Source: U.S. Department of Energy, Barclays Capital. Note: 2011 data year-to-date as of end of September.

Figure 64: Total Project Price vs. Cost Savings



Source: U.S. Department of Energy, Barclays Capital. Note: 2011 data year-to-date as of end of September.

Commercial and Industrial: An Underpenetrated, Though Difficult, Market

The commercial and industrial market, while significant, remains underpenetrated largely due to structural challenges in making performance-based long-term contracts attractive.

Though it remains one of the largest potential market opportunities, the commercial and industrial arena has been slow to adopt solutions provided by ESCOs. If we consider the factors that have driven success in both the MUSH and federal markets — owner-occupied buildings, long-term occupants, narrow-focused usage, high credit rating — we can see why a performance-based business model is attractive within these arenas. However, these conditions are not as easily replicated in the commercial and industrial sector. A performance-based business model is based on an ESCO's ability to deliver material energy reductions over the course of a long-term period. Factors such as a new occupant or change in energy usage, for example, can impact the payback period and thus increase risk associated with hitting energy reduction targets as well as the financing of the investments. These, along with other factors, are highly susceptible to higher levels of volatility in the commercial and industrial markets, making it that much more difficult for ESCOs to penetrate what could be a potentially lucrative opportunity.

Market Outlook

We estimate that the U.S. market has a multi-year CAGR of approximately 15-20% over the next few years drive by healthy demand from federal and MUSH markets.

Specific market data on the size of the ESCO market in North America is difficult to come by. However, based on the data available and our discussions with industry participants, we estimate that the market is currently around $6 billion, with 50-60% stemming from the MUSH arena, 20-30% from the federal market and 10-30% from the commercial and industrial market. We estimate the market has a multi-year CAGR of approximately 15-20% supported primarily by healthy demand at the federal, state and local level as well as the education and healthcare markets.

AMERESCO INC. (AMRC; 1-OVERWEIGHT/2-NEU); PRICE TARGET $14

AMRC

Stock Rating
1-OVERWEIGHT

Sector View
2-NEUTRAL

Price Target
USD 14.00

Price (08-Nov-2011)
USD 11.18

Potential Upside/Downside
+25%

Ameresco Inc.(AMRC): Quarterly and Annual EPS (USD)

	2010	2011			2012			Change y/y	
FY Dec	Actual	Old	New	Cons	Old	New	Cons	2011	2012
Q1	0.03A	N/A	0.12A	0.12A	N/A	0.11E	0.11E	300%	-8%
Q2	0.20A	N/A	0.19A	0.19A	N/A	0.18E	0.21E	-5%	-5%
Q3	0.28A	N/A	0.27A	0.27A	N/A	0.32E	0.32E	-4%	19%
Q4	0.17A	N/A	0.18E	0.22E	N/A	0.31E	0.25E	6%	72%
Year	0.69A	N/A	0.76E	0.79E	N/A	0.92E	0.93E	10%	21%
P/E	16.2		14.7			12.2			

Source: Barclays Capital
Factset

COMPANY SNAPSHOT

Ameresco U.S. Clean Technology and Renewables

Income statement ($mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	618	725	792	833	10.5%
EBITDA	60	67	78	83	11.6%
EBIT	46	52	64	69	14.3%
Pre-tax income	41	47	60	65	16.5%
Net income	29	35	43	47	17.5%
Reported EPS ($)	0.69	0.76	0.92	0.97	12.1%
Diluted shares (m)	42	46	47	48	4.8%
Dividend per share ($)	-	-	-	-	NA

Margin and return data (%)					Average
EBITDA margin	9.7	9.2	9.8	10.0	9.7
EBIT margin	7.4	7.2	8.1	8.2	7.7
Pre-tax margin	6.6	6.4	7.6	7.8	7.1
Net margin	4.6	4.8	5.5	5.6	5.1
ROIC	9.0	11.6	12.5	12.8	11.5
ROA	4.9	6.0	7.4	8.0	6.6
ROE	14.7	14.6	15.3	14.2	14.7

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	149	184	234	285	24.3%
Intangible fixed assets	21	42	42	42	26.8%
Cash and equivalents	45	55	6	(6)	NA
Total assets	584	584	584	584	0.0%
Short and long-term debt	207	332	229	127	-15.0%
Other long-term liabilities	182	192	210	203	3.7%
Total liabilities	389	523	439	330	-5.4%
Net debt/(funds)	162	276	223	133	-6.4%
Shareholders' equity	195	239	283	329	19.1%
Change in working capital	33	59	9	(3)	NA
Operating cash flow	23	30	115	155	89.1%
Capital expenditure	40	49	62	65	17.8%
Free cash flow	42	31	102	121	42.0%

Valuation and leverage metrics					Average
P/E (x)	15.1	13.8	11.4	10.8	12.8
EV/EBITDA (x)	10.0	11.3	9.2	7.6	9.5
FCF yield (%)	9.7	6.4	20.6	24.2	15.2
Price/sales (x)	0.7	0.7	0.6	0.6	0.6
Price/BV (x)	2.2	2.0	1.7	1.5	1.9
Dividend yield (%)	0.0	0.0	0.0	0.0	0.0
Total debt/capital (%)	51.5	58.1	44.8	27.9	45.6

Selected operating metrics					CAGR
Energy Efficiency	455.3	571.2	658.2	700.0	15.4%
YoY Growth Rate	33.7%	25.4%	15.2%	6.3%	
Renewable Energy	162.9	154.2	133.5	133.5	-6.4%
YoY Growth	85.4%	-5.3%	-13.4%	0.0%	

Source: Company data, Barclays Capital

Stock Rating	1-OVERWEIGHT
Sector View	2-NEUTRAL
Price (08-Nov-2011)	$ 10.48
Price Target	$ 14.00
Ticker	AMRC

Investment case

Given AMRC's position as the leading independent ESCO in NA, we believe the company is well positioned to capture opportunities as organizations look to tap third party financing to meet various renewables standards. Our price target of $14 equates to ~14x our CY13 EPS estimate of $0.97.

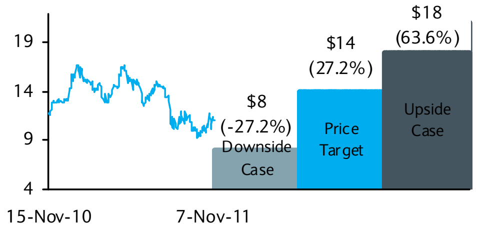
Upside case $ 18.00

Improving adoption of ESCO deployments could enable AMRC to hit market expectations of 10-15%+. While we wouldn't expect material margin expansion, potential '13 upside could earn ~$1.10. Factoring in some multiple expansion to 16x yields an upside case of $18.

Downside case $ 8.00

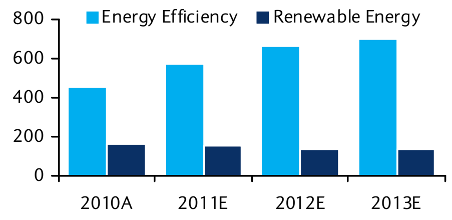
Weakened demand in the MUSH markets, and a delay in the federal market could negatively impact growth in '12 and '13. Modest growth with no margin expansion equates to potential downside of $0.80 in '13, along with multiple contraction (~10x) leads to an $8 downside case.

Upside/downside scenarios



Source: FactSet

Revenue by Business Unit



Note: FY end Dec.

Ameresco (AMRC) – Initiating Coverage at 1-OW

We initiate coverage of Ameresco (AMRC) with a 1-Overweight/2-Neutral rating and price target of $15. Overall, we view the ESCO market as highly attractive as it combines a high visibility cash-generative business with comparatively high barriers to entry and a steady regulatory tailwind for stable long-term market opportunities. Although awards are likely to be lumpy, particularly in the MUSH (municipality, university, school, and hospital) markets, we believe federal opportunities should pick up in 2012-13 as budget constraints compel agencies to look for third-party financing/vendors to help meet executive orders and regulatory requirements for energy efficiency. Given its position as one of the leading independent ESCOs, we believe Ameresco is well positioned to capitalize on these trends.

Our 2012 estimates factor in the transition to an operations and maintenance contract (approximately $15-$18 million in revenues during the first year, and $20 million per year in out years) upon delivery of the Savannah River facility in 4Q11, and continued healthy growth in the company's overall energy efficiency business. Our estimate for total revenues for the year is $791 million, up 9% y/y. We expect modest improvement in the company's margin structure, yielding our 2012 EPS estimate of $0.92. For 2013, we establish revenue and EPS estimates of $834 million and $0.97 respectively. Our price target of $14 equates to approximately 14x our CY13 EPS estimate of $0.97.

Ameresco – Company Description

Ameresco is a supplier of energy efficiency and renewable power solutions for facilities in North America.

Founded in 2000 and headquartered in Framingham, Massachusetts, Ameresco is a supplier of energy efficiency and renewable power solutions for facilities in North America. The company is the largest independent ESCO in the United States. Ameresco's solutions are designed to give customers the opportunity to reduce energy consumption and operating costs while minimizing upfront investment. The company's solutions address most aspects of utilizing energy within a facility and include upgrades to a facility's energy infrastructure. Improvements generally involve heating, ventilation, air conditioning and lighting systems. Ameresco's services also include the construction and operation of small-scale renewable energy plants located at or near a customer's site.

The Ameresco business model operates via energy savings performance contacts (ESPC). Under an ESPC, Ameresco ensures agreed-upon energy efficiency and performance standards upon installation with its customer. The company requires no upfront capital from its customer until the project is completed and accepted. In order to finance such a project, Ameresco uses internal capital and assists customers in obtaining third-party financing. After the completion of a project, the company may maintain, operate or repair a customers' energy system generating recurring revenue and potential future awards for Ameresco. Effectively, the structure of the contract is designed to be budget neutral – i.e., the entity the company services pays Ameresco what it saves by deploying its solutions.

Ameresco's operations are broken into four segments: U.S. Federal, central U.S. region, other U.S. regions and Canada and typically service the MUSH markets (municipalities, universities, schools and hospitals). Approximately 90% of the company's 2010 revenues are from services to state, federal, and other government facilities. The company has a national footprint of approximately 60 offices in 30 plus states and five Canadian provinces and hosts a customer base of 1,000 plus customers. According to the company, Ameresco has worked for over 2,000 customers and completed roughly $2 billion in energy efficiency related projects since its inception.

AMRC – Investment Positives

Regulatory Support Provides Strong Tailwind for ESCO Market

Regulatory support at the federal, state and local levels provides a supportive environment for the ESCO market. Various mandates across different tiers of government require material reductions in energy use by government institutions over the next 10–20 years. Coupled with the need to update aging infrastructure and expectations of rising energy costs, we expect a fertile back drop for the energy efficiency solutions market.

Challenged Economic Backdrop Heightens Value Proposition

The ESCO business model is budget neutral; i.e., an organization pays for the infrastructure upgrade through the savings generated through a project. In other words, over a fixed period of time, the cost of a project is paid for by money already being allocated to energy consumption. Any energy savings after the contract period accrue back to the customer. Therefore, various government agencies that cannot appropriate dollars toward new projects don't have to: Ameresco arranges the third party financing and assumes the risk that the savings will cover the cost of the project.

A High-Visibility Business

Ameresco generates approximately 80% of its business from backlog providing it with healthy visibility on its revenue stream. At the end of 3Q11, backlog stood at $1.2 billion. Management expects market growth in the range of 15-20% over the next few years suggesting a healthy pipeline of activity over the longer term.

AMRC – Investment Risks

Scope for Margin Advancement Limited

Ameresco prices most of its contracts on a cost-plus basis. While increased O&M revenues provide some opportunity to edge its gross margins to the 20% level (17.5% currently), we believe material expansion is unlikely. Similarly, we believe management's principle focus for opex is scaling its geographic footprint when necessary and therefore believe EBITDA margin (adjusted) beyond current levels is unlikely.

Potential Volatility in MUSH Market Activity

Ameresco derives a significant portion of its revenues from the MUSH (municipalities, universities, schools and hospitals) market. Given the current macro environment, many of these institutions are facing budgeting constraints. While Ameresco's business model provides a budget neutral option in funding infrastructure upgrades, budgeting concerns could impact funding availability and timelines of project conversion from award to construction.

This isn't the CEO's First Rodeo

Ameresco Chairman and CEO, George Sakellaris, is not new to the ESCO market. He founded, grew and sold now competitor NORESCO years ago and is looking for another go at the market. In out view, this is in fact a strength; however, given his substantial holdings of the company (he is Ameresco's largest shareholder of listed Class A shares at 12.5% and a 100% owner of the 18 million Class B shares outstanding bearing 5 votes per share) an investment in Ameresco is essentially an investment in Mr. Sakellaris.

AMRC – Our View

Overall, we believe an investment in Ameresco is really a twofold investment. First, it is essentially an investment in CEO George Sakellaris. As mentioned, Mr. Sakellaris has a majority of the voting rights in Ameresco, and thus investors must have faith that lightning can strike twice. We highlight out investment framework below.

The second part is the value proposition of the ESCO market, because quite frankly, if the ESCO market grows, so will Ameresco. While we expect some near-term humps given the macroenvironment (no one should expect MUSH, particularly municipalities, to think logically against a tempered macro backdrop), we expect the value proposition to prove itself out over time.

From a business perspective, we consider the ESCO model highly attractive, given long-term contracts, healthy visibility, comparatively high barriers to entry and steady cash generation.

Figure 65: Ameresco (AMRC) Investment Framework

Market Growth Opportunity	◕	- We estimate the ESCO market will grow 15-20% a year over the next few years, supported by federal, state, and local initiatives. Though not high growth, the market should be relatively stable over the longer term. - Awards are likely to be lumpy, however (as evidenced by AMRC's backlog), and thus uneven. - Project-based financing provides a compelling value proposition in a challenged macro environment.
Potential for Share Gains	◕	- We consider AMRC the leading independent ESCO provider. - The company's improved scale (through acquisitions) positions it well to gain share as demand improves.
Likelihood of Margin Expansion	◔	- We expect modest margin expansion as most of AMRC's contracts are structured as "cost plus," providing limited maneuverability. - Business mix shift could provide a positive impact, though we consider it unlikely that AMRC's gross margin would exceed 20%.
Barriers to Entry	◑	- The ability to operate in the ESCO market requires very strong relationships across multiple layers of government and the ability to navigate those layers. - Moreover, opportunities for growth are quite disparate and thus providers need to have a broad geographic footprint in order to be successful.
Capitalization	●	- Excluding the financing for federal ESPC projects, Ameresco maintains limited debt on its balance sheet. - In addition, Ameresco has a strong cash balance and healthy cash generation generally used to finance acquisitions for geographically diverse product portfolios.
Risk Profile	◕	- While near-term trends may be lumpy due to the award cycle from the MUSH markets, we believe longer-term growth from federal demand, the company's economic value proposition, and healthy cash generation make it one of the lower risk names in our coverage universe.
Valuation	◕	- AMRC currently trades at ~12x our CY13 EPS estimate of $0.95, the low end of our energy efficiency solutions comparable set at 17x and below its historical average of 15x since its late-2010 IPO. - As visibility on an improving demand environment builds, we expect multiple expansion to follow.

Source: Barclays Capital

Background

Ameresco is a leading independent ESCO in North America founded by industry veteran George Sakellaris.

Ameresco was founded in Delaware in 2000 by George P. Sakellaris with a vision to build a product-neutral and supplier-independent energy company that leverages its skills and knowledge in energy solutions that go beyond just conservation. Ameresco isn’t Mr. Sakellaris’s first go at the ESCO market. In 1989, he took the reins of Ameresco’s current competition, NORESCO, a Westborough, Massachusetts-based company which he sold to Equitable Resources in 1997. Believing that consolidation of independent providers by utilities/commodities providers was imminent, Mr. Sakellaris felt it best to exit the market. However, since selling NORESCO, the market has evolved in a different manner whereby customers appreciate and understand the value of purchasing solutions from independent providers. So with a $6 million investment, he founded Ameresco 10 years ago to continue to capitalize on what he perceived to be positive trends in the market.

Mr. Sakellaris grew Ameresco from four offices in three states in 2001 to 60 offices in 30 states and five Canadian provinces. The company has now grown through a combination of organic growth and 13 acquisitions to its annual revenue levels of $620 million. Ameresco reached profitability in 2002 and has been profitable every year since.

Historically, Ameresco has relied on both organic and inorganic growth and acquisitions to increase its scale and regional footprint.

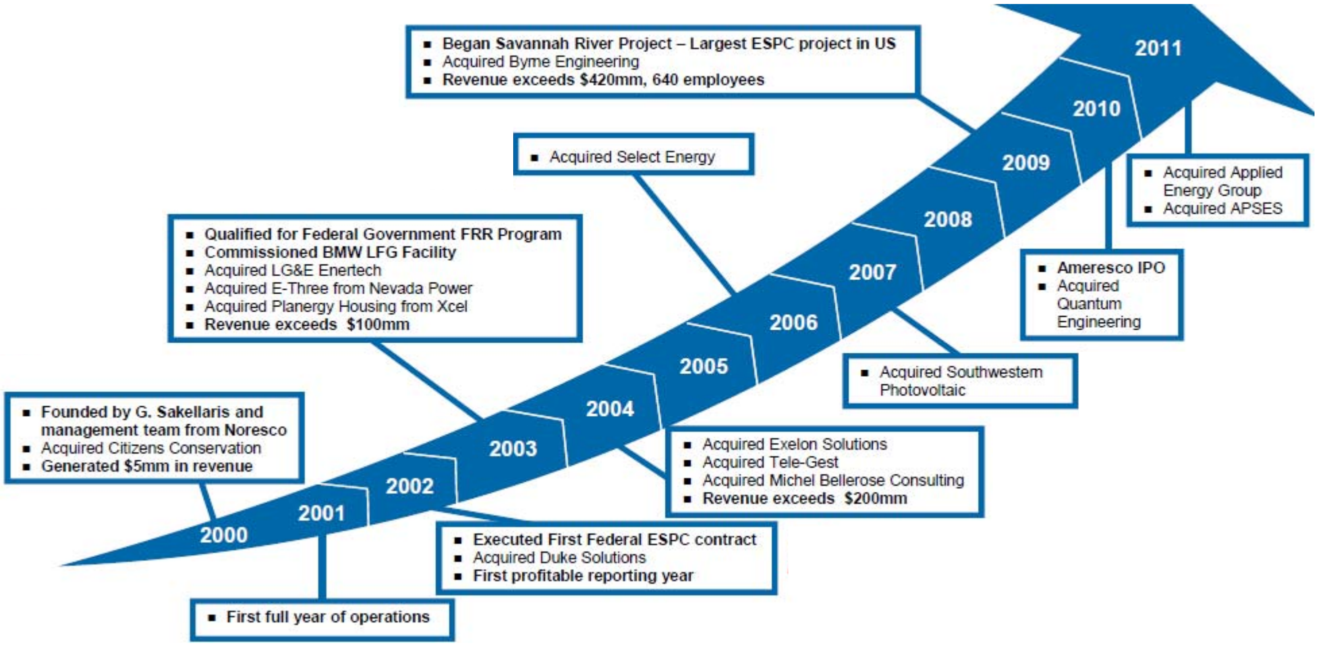
Over the course of Ameresco's history, it has made 13 acquisitions primarily for the purpose of geographic expansion and enlarging its regional footprint. The company gained greater exposure to new regions of North America with each acquisition in its pipeline. Ameresco generally targets companies at an inflection point, that is, companies that have grown organically and are in need of a strategic partner to grow further. We have highlighted some important acquisitions since Ameresco's initial public offering:

- **Quantum Engineering and Development:** Ameresco acquired Quantum Engineering and Development in September 2010, two months after its initial public offering. Quantum provides energy and water auditing, engineering, construction and commissioning services to the greater Northwest area. With a strong footprint in the Northeast and Southeast, this acquisition offered Ameresco the opportunity to increase its presence in the West to key markets and regions. Ameresco paid $6.1 million for Quantum.

- **Applied Energy Group:** In order to expand energy efficiency and demand side management services for utilities, Ameresco acquired Applied Energy Group (AEG) in July 2011. Utilities spent over $5.4 billion for energy efficiency and demand side management services in 2010 and Ameresco expects this market to exceed $12 billion in 2020. Ameresco primarily offers energy solutions for governmental organizations, but with this acquisition, it is now better positioned to attract utility contracts. Also, unlike its acquisition of Quantum or APSES for geographic expansion, this acquisition was for the purpose of adding additional services to its solutions portfolio.

- **APS Energy Services:** Ameresco acquired APS Energy Services (APSES), an energy services company in the Southwest, in August 2011. Like with its acquisition of Quantum, Ameresco acquired APSES to broaden its geographic exposure. Prior to the acquisition, Ameresco had very little exposure to the Southwest and found it would be more beneficial to make the acquisition than to wait and grow organically.

Figure 66: Ameresco Acquisition History


Began Savannah River Project – Largest ESPC project in US
Acquired Byrne Engineering
Revenue exceeds $420mm, 640 employees
2011
2010
Acquired Select Energy
2009
Acquired Applied Energy Group
Acquired APSES
Qualified for Federal Government FRR Program
Commissioned BMW LFG Facility
Acquired LG&E Enertech
Acquired E-Three from Nevada Power
Acquired Planergy Housing from Xcel
Revenue exceeds $100mm
2008
2007
Ameresco IPO
Acquired Quantum Engineering
2006
Acquired Southwestern Photovoltaic
2005
Founded by G. Sakellaris and management team from Noresco
Acquired Citizens Conservation
Generated $5mm in revenue
2004
2003
Acquired Exelon Solutions
Acquired Tele-Gest
Acquired Michel Bellerose Consulting
Revenue exceeds $200mm
2002
2001
2000
Executed First Federal ESPC contract
Acquired Duke Solutions
First profitable reporting year
First full year of operations

Source: Company Reports

Ameresco's Solutions Portfolio

Ameresco offers a wide range of energy efficiency solutions ensuring the reduction of operating expenses for its own customers.

Ameresco offers a wide range of energy efficiency solutions ensuring reduced operating expenses, upgraded facilities, stabilized energy costs, improved occupancy and increased energy reliability through budget neutral solutions. It designs projects that ensure energy savings to preserve budgets for its customers. The company reports its financial results in four business segments which are largely aligned with its major geographic areas of operations. These include U.S. Federal, central U.S. region, other U.S. regions and Canada. Within each segment, the company provides both energy efficiency and renewable energy services and products.

Energy Efficiency

Energy efficiency solutions comprise 75% of Ameresco's revenues, the company's largest business.

As Ameresco's largest business segment by revenues, the energy efficiency business unit implements energy-efficiency contracts, as well as the operations and maintenance of previously constructed assets. The company aims to improve energy efficiency at an enterprise level through the use of customized projects as well as the maintenance of new equipment. Ameresco identifies capital projects and operational modifications that can reduce energy consumption and associated costs. As the largest independent energy services company (ESCO), Ameresco's diverse portfolio of services can be specialized for any customer. Its core competencies in this business include equipment efficiency, load management, operational efficiency and process productivity. The demand side management capabilities at the company will also work with customers to acquire energy rebates or tax credits for reduction of energy consumption.

- *Energy Supply Management:* The energy supply management team provides assessments of supply-side dynamics based on the current regulatory environment, market conditions, pricing and contracts in place.

- *Energy Infrastructure:* Ameresco offers energy infrastructure improvements and retrofits to decrease costs and increase efficiency in plants and various facilities. The solutions are generally geared toward commercial, industrial, institutional and government customers. Ameresco generates improvements in energy, heating, cooling and water consumption.

- *Invoice Management:* Ameresco AXIS Invoice Management offers energy consumption data for each location in an organization and fully automates the bill management process with technology that provides faster access to accurate data. This technology is designed to reduce human error in utility-bill management.

Renewable Energy

The company is also one of the largest developers of renewable energy assets for its customers.

The assets could include landfill gas, solar generation and biomass facilities.

Ameresco is one of the largest U.S. developers of renewable assets. Principally, the company's business includes the construction of landfill gas (LFG), solar generation plants, biomass and the resale of photovoltaic panels and systems. The company also operates its own LFG facilities selling proven vender power purchase agreements (PPAs) to local utilities and third parties. The company coordinates the construction and design of the respective renewable asset and other times maintains and operates the asset. In some cases, Ameresco may retain ownership of the specific project. Projects are generally by either ESPCs, tied to PPAs, or serve as turnkey solutions for various entities. Following acquisitions, we believe expansion of the company's renewable assets is its primary use of cash. Earlier this year, management indicated that it expects to spend approximately $25–30 million in renewable asset expansion.

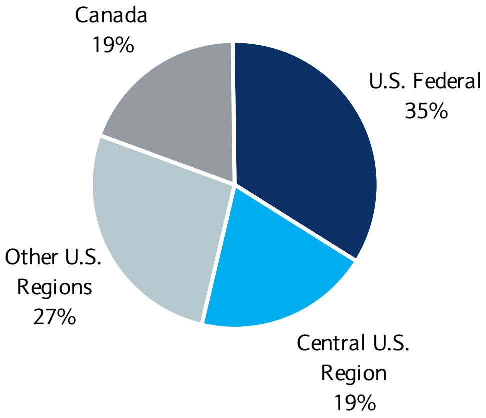
- *Landfill Gas/Biogas:* Ameresco works as an intermediary between landfills and nearby clients to develop landfill gas-to energy (LFGTE) projects that can capture the gas for electricity and heat generation purposes. Ameresco offers similar solutions for biogas. In general, the company either develops facilities at a customer site by owning and operating the asset and selling the power back to third-party customers or develops a turnkey asset for a specific customer.

- *Biomass:* Ameresco builds power cogeneration and distributed generation facilities that are scaled to meet a significant portion of a facility's energy needs, Ameresco generally finances this technology through purchase power agreements (PPA) or energy savings performance contracts (ESPCs).

- *Wind:* Ameresco has the resources to guide customers though the entire process from government and community approval to implementation and ownership.

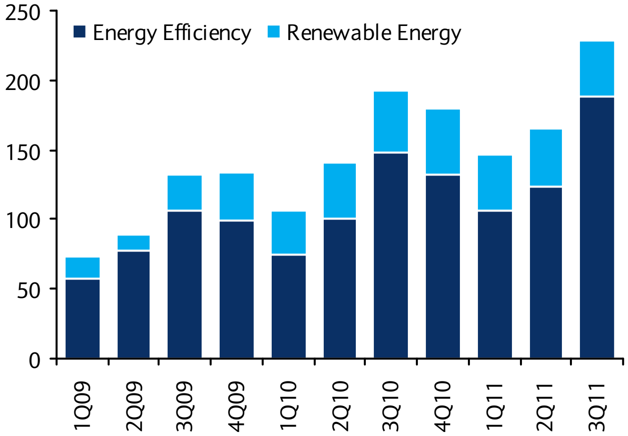
- *Photovoltaic Systems:* Ameresco, like with most of its solutions, attempts to eliminate the budget obstacles and incentive instability from standard PV projects by financing the projects for its customers and reducing their up-front capital payment.

Figure 67: Ameresco's 2010 Revenue by Customer



Source: Barclays Capital, Company Reports

Figure 68: Ameresco's Revenue by Service ($ mn)



Source: Barclays Capital, Company Reports

Competitive Landscape

Competition includes product vendors, energy companies, and other independent service providers.

The competitive landscape is largely segmented into three buckets: product companies, utilities/utility affiliated firms, and independent providers. As highlighted earlier in this report, product companies (e.g., Johnson Controls, Carrier) primarily utilize energy efficiency solutions as a channel for their products, whereas utilities/utility affiliated firms (e.g., ConEdison, Pepco Energy Services) typically use them either as a means to drive profit and/or meet various regulatory requirements. We consider Ameresco the largest independent domestic ESCO with low to mid-double-digit market share.

Ameresco's Management Team

Members of Ameresco's management team are led by Mr. George Sakellaris, who founded, developed, and grew the company. Over its 10-plus years in existence, the company has grown through a combination of organic growth and 13 acquisitions to its current annual revenue level of $620 million.

- **George Sakellaris:** Mr. Sakellaris serves as the President, CEO and Chairman of the Board at Ameresco. He founded the company in 2000 with a vision to build a product-neutral and supplier-independent energy company that leverages its skills and knowledge in energy solutions that go beyond just conservation. Early in his career, Mr. Sakellaris worked at New England Electric Systems where he established a sub-division that promoted energy efficiency. He eventually bought that sub-division in 1991 and renamed it Noresco. Mr. Sakellaris grew Noresco into an industry-leading independent energy services firm before selling it in 1997, three years before he founded Ameresco.

- **Andrew Spence:** Mr. Spence serves as the Vice President and CFO of Ameresco. Before joining Ameresco in 2002, Mr. Spence served as the CFO of ABB Energy Capital, a financial services company that provides project financing for the energy-efficiency and small power-generation markets. Prior that, he worked for Bank of Boston.

- **David Anderson:** Mr. Anderson is on the Board of Directors and has been the EVP of Business Development at Ameresco since helping launch the company in 2000. One of Mr. Anderson's primary roles at the company is to structure and negotiate complex contracts for the company. Mr. Anderson is also a member of the Clinton Climate

Initiative, the National Association of Energy Service Companies, the National Association of Country Officials, and various state organizations. Throughout his career, Mr. Anderson held executive and senior positions involving energy projects and utility programs representing over $5 billion dollars.

- **Keith Derrington:** Mr. Derrington joined Ameresco in 2004 as the VP and General Manager of Federal Operations. In 2009, he held the same position but was promoted to EVP. Mr. Derrington is in charge of Ameresco's Federal Solutions group and is responsible for managing Federal projects. He served as the Vice President and General Manager of the Federal Group at Exelon, an electric utility, before it was acquired by Ameresco.
- **Joseph DeManche:** Mr. DeManche joined Ameresco in 2002 as the EVP of engineering and operations. Mr. DeManche joined the company as a result of its acquisition of DukeSolutions where he served as the EVP in charge of all commercial operations. He served as COO of Energy Investment prior to that.
- **David Corrsin:** Mr. Corrsin serves as the EVP and General Counsel of Ameresco. He is also the Corporate Secretary and is a board member. Mr. Corrsin is in charge of financial and regulatory issues of conservation projects for the company. Prior, Mr. Corrsin served as an EVP of Public Power International, an independent developer of power projects in South Asia and Europe. Mr. Corrsin also had positions at Palmer & Dodge, Chadbourne & Parke, Hudson Research, and the National Wildlife Federation; each position having a focus on energy.

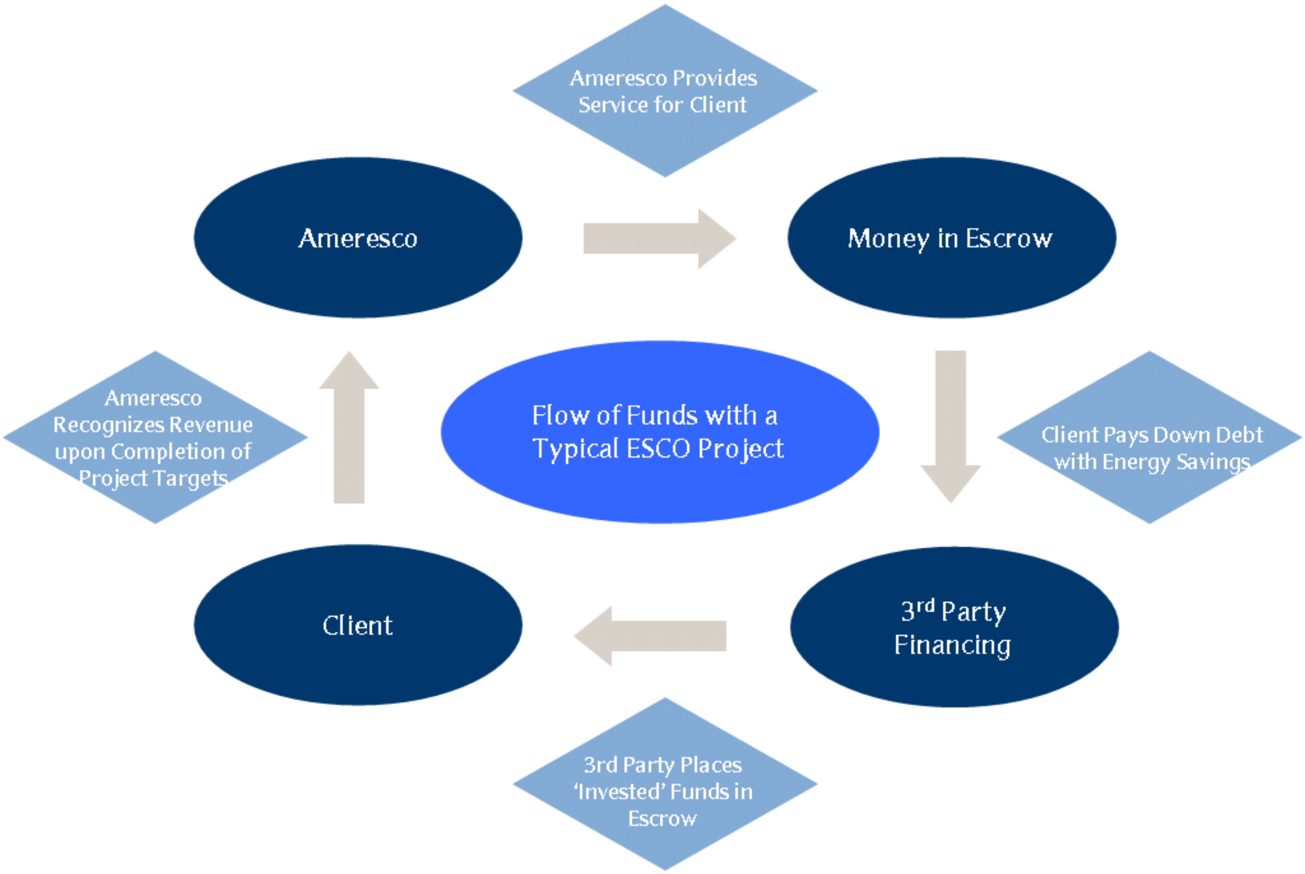
AMRC – Investment Outlook

Understanding Ameresco's Capital Structure

In our view, Ameresco has a healthy balance sheet as most of its debt is pre-assigned to third-party financiers.

Given Ameresco's role in arranging the financing required for energy efficiency solutions, we believe investors need to have a comprehensive understanding of the company's capital structure. Currently, the company has $337 million in total debt and has a total debt to capital ratio of .59x. While relatively high, a majority of its debt (approximately $237 million) is attributed to financing for federal ESPC projects. This is important to note, as Ameresco has limited accountability to this "debt"; the company does not pay for any interest on the ESPC receivables financing and payments are not settled out of the company's cash flows.

Figure 69: Flow of Funds with a Typical ESCO Project


Ameresco Provides Service for Client
Ameresco
Money in Escrow
Flow of Funds with a Typical ESCO Project
Ameresco Recognizes Revenue upon Completion of Project Targets
Client Pays Down Debt with Energy Savings
Client
3rd Party Financing
3rd Party Places 'Invested' Funds in Escrow

Source: Barclays Capital

Specifically, when the company is in the stage of implementing a Federal ESPC contract, it books a Federal ESPC receivable as an asset on its balance sheet. This is offset by a Federal ESPC receivable liability. However, the liability is assigned to a third party, and thus when the project is completed (i.e., the completion of final acceptance of the project) the liability is charged against the receivable asset eliminating it from the balance sheet. The repayment and debt service is managed by the government to whatever third party is financing the institution. Therefore, we believe that an appropriate way to look at Ameresco's debt is to eliminate the federal ESPC obligations as they are already assigned to a third party. Excluding the ESPC obligations, Ameresco's debt position stands at $337 million, with its debt to total capitalization of .59x.

Investment in the Business is Management's Primary Use of Cash

We believe investment in its business – either through acquisition or developing renewable assets – will remain the company's cash use priority.

We believe management's primary use of cash will remain its ongoing investment in the company's business. As previously highlighted, Ameresco continues to utilize acquisitions as a means to expand its footprint. We consider scale increasingly important in the ESCO market as various organizations and third-party financing firms look to better capitalized larger scale partners as means to carry out long-term contracts. Therefore, we expect Ameresco to continue to evaluate potential acquisition targets.

Management has also indicated that a portion of its excess cash would be deployed to improving its renewable asset base. At the beginning of the year, management indicated that it expects to use $25-$30 million in expanding its renewable asset base and spent $14 million as of October 2011. Besides acquisitions, renewable asset expansion is likely to remain the company's second major use of cash.

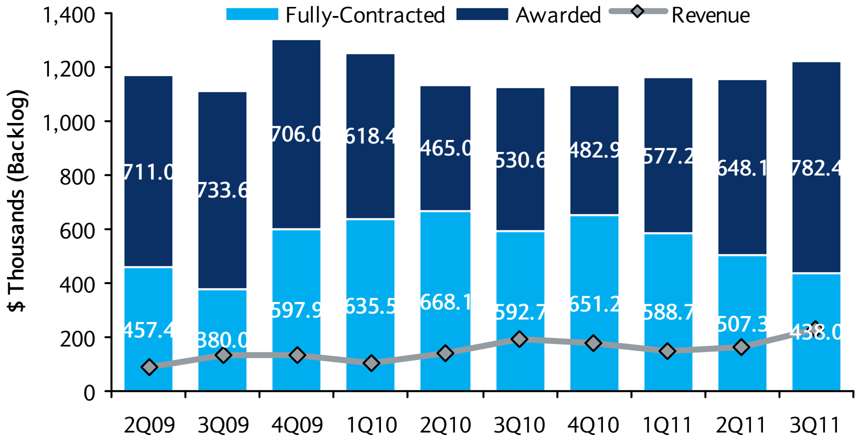
Stock Dependent on Capitalizing on Steady Growth Opportunity

In our view, share appreciation for Ameresco is dependent on its ability to capitalize on a steady growth opportunity in the energy efficiency solutions market. We believe the company's "budget neutral" business model proves increasingly attractive in the tepid macroeconomic backdrop. Our own checks with industry participants suggest healthy market demand driven largely by: 1) regulatory requirements for reduced energy usage and 2) the desire to reduce costs in a challenged revenue environment. We recognize that in the prior downturn the company's business faced some demand headwinds. We attribute this to a pause in spending as various agencies/organizations were waiting for clear guidelines around the American Recovery and Reinvestment Act before allocating dollars to energy efficiency programs. We consider the current demand environment supportive.

Backlog Provides Healthy Visibility

Ameresco drives approximately 80% of its revenues from backlog. Based on its current backlog levels of $1.2 billion, we believe the company has healthy visibility for at least the near term.

Figure 70: Ameresco – Backlog Profile



Source: Company Reports, Barclays Capital

Material Margin Expansion Somewhat Limited

In our view, material margin expansion is somewhat limited. First and foremost, Ameresco prices its projects on a cost-plus basis, and thus is unlikely to be able to diverge materially from general industry pricing practices. Its operations and maintenance revenues are accretive to its corporate gross margins and thus as they increase, we expect margins to improve. However, with 20% or so at the high end of the range, we don't expect material upside as the company recently reported gross margin of 17.5% for 3Q11. On an operating margin perspective, we expect the company to continue to invest in order to support top-line growth including solidifying its regional footprint to have the assets necessary to capture local opportunities. Given management's long-term target for adjusted EBITDA is in the 10% range, and Ameresco just exited 3Q11 with 9.4% EBITDA margins, we see limited upside for material margin expansion.

AMRC – Outlook

Following a healthy 3Q11 and improvement in the company's booking trends, management edged up full-year sales guidance to $722-$727 million from $690-$705 million in the prior quarter, equating to approximately $185 million of sales revenue in 4Q11E. The 37% q/q increase in sales for 3Q11 was driven by around $15 million in acquisition-related revenues (AEG and Ameresco Southwest) yielding organic q/q sales growth of 30%, which was driven by seasonal construction pick-ups due to the summer season. Despite raising sales guidance, management reiterated its EBITDA and net income guide of $67-70 million and $35-$37 million, respectively, which was primarily a function of higher-than-expected costs associated with an unsurprising prolonged award cycle. In 3Q11, management noted that its backlog was up 6% to $1.2 billion due to a 21% increase in awarded projects q/q.

Ameresco's principal business unit, energy efficiency, accounted for 83% of total revenues, which is up 50% q/q owing to an additional $10 million of acquisition-related revenue and continued growth of installation activity. Gross margin for the energy efficiency business came in at 17.4% due to lower margin projects and a one-time charge related to customer disagreements that were partially offset by positive margin contribution from its two acquisitions. Renewable energy gross margin was 18%, down 750bp q/q largely because of the previously mentioned one-time charges and four unexpected plant maintenances. Management expects this business, which entails small-scale infrastructure, integrated-PV and O&M, to contribute more to the top line over time and to improve gross margin as it is a higher gross margin business.

Estimates and Valuation

Our 2012 estimates factor in the transition to an operations and maintenance contract (approximately $15-$18 million in revenues during the first year, and $20 million per year in out years) upon delivery of the Savannah River facility in 4Q11, and continued healthy growth in the company's overall energy efficiency business. Our estimates for total revenues for 2012 are $791 million, up 9% y/y. We expect modest improvement in the company's margin structure, yielding our EPS estimate of $0.92. For 2013, we establish revenue and EPS estimates of $834 million and $0.97, respectively. Our price target of $14 equates to roughly 14x our CY13 EPS estimate of $0.97.

Figure 71: Energy Efficiency Comparable Companies

($ in millions except per share data)															Calendar Year Trading
			Price as of	Market	Firm	Calendar Year Sales			Calendar Year EPS			Price to Sales			EV / Sales
Company	Ticker	Rating	11/8/11	Capitalization	Value	2011E	2012E	2013E	2011E	2012E	2013E	2011E	2012E	2013E	2011E	2012E
ENERGY STORAGE																
Covanta	CVA	2-EW	14.67	2,053.8	4,097.8	1,616.0	1,649.0	1,606.0	0.51	0.61	0.70	1.3	1.2	2.6	2.5	2.5
EnerNOC	ENOC	Not Rated	12.01	306.7	153.3	288.6	291.2	423.2	(0.34)	(0.84)	0.79	1.1	1.1	0.4	0.5	0.5
Johnson Controls	JCI	1-OW	32.62	22,173.1	27,062.1	41,924.0	45,015.0	NA	2.49	3.34	NA	0.5	0.5	NA	0.6	0.6
Quanta Services	PWR	Not Rated	20.95	4,414.2	4,156.5	4,490.0	5,229.0	5,973.0	0.66	1.19	1.49	1.0	0.8	0.7	0.9	0.8
											MEAN	1.0	0.9	1.2	1.2	1.1
											MEDIAN	1.0	0.9	0.7	0.8	0.7
											HIGH	1.3	1.2	2.6	2.5	2.5
											LOW	0.5	0.5	0.4	0.5	0.5
Ameresco	**AMRC**	**1-OW**	**11.18**	**513.2**	**818.5**	**725.4**	**791.8**	**833.5**	**0.76**	**0.92**	**0.97**	**0.7**	**0.6**	**1.0**	**1.1**	**1.0**

Source: Barclays Capital, FactSet. Estimates for non-covered companies are from FactSet.
Stock rating: 1-OW = 1-Overweight; 2-EW= 2-Equal Weight; 3-UW = 3-Underweight. Sector rating for US Clean Technology & Renewables is 2-Neutral.
CVA is covered by Barclays Capital's US Power & Utilities analyst Gregg Orrill. The sector rating is 2-Neutral. JCI is covered by Barclays Capital's US Autos & Auto Parts analyst Brian Johnson. The sector rating is 2-Neutral.

ENERGY EFFICIENCY SOLUTIONS II: SMART GRIDS

Key Trends

Smart Market Growth

CAGR projections for installed meters through 2015: electric, 24.3%; gas, 18.1%; water, 21.8%.

We expect the smart grid market to grow at a CAGR of roughly 16% through 2014, representing a market size of approximately $171 billion. Out of the 2.65 billion or so meters installed in the world, automatic meter reading (AMR) penetration levels are at 12%, split largely between automated electric, gas, and water meters. According to Zpryme, the projected annual installed base of meters will grow at a CAGR of 23% through 2015, divided between electric, gas, and water at CAGRs of 24.3%, 18.1%, and 21.8%, respectively. The adoption cycle is gaining momentum in certain parts of the world in tandem with government incentives, and beginning to mature in others as incentives dry up.

Global Adoption Cycle

Europe should see strong growth starting 2013, driven by the EU 2020 Directive and aging infrastructure.

Penetration levels in the smart grid vary based on geography. We are currently seeing the pilot deployment phase mature in North America as larger utilities and commodities providers have already used stimulus funds to sample the technology and award many of the large-scale projects. While regional opportunities are likely to continue, we believe they will be tied mostly to smaller scale utility providers as well as the gas and water markets, both of which are traditionally slower adopters of new technology. In our view, the large opportunity lies in Europe and the emerging markets. Europe lags North America in adoption but we expect it to have a significant growth trajectory beginning in 2013 primarily fostered by the EU 2020 Directive and aging infrastructure. The emerging markets are in the early stages of the pilot phase, but we do expect to see lumpy and potentially significant order flow out of these regions over time.

Diversified End Markets

The largest of the three major meter markets for smart meter deployment is the electric meter market. The electric meter upgrade cycle is ahead of gas and water, driven by its overall presence in the meter market. Of the 2.65 billion meters installed globally, almost 50% are electric meters, of which 7.5% are automated. We expect the electric meter market to continue to grow, but at a slower pace. The gas market typically lags the electric market and the water market typically lags the gas market. We expect to primarily hear of more contract awards in electric and gas metering out of Europe and some gas and water metering awards out of North America.

Key Challenges

Maturing North American Market

Large North American contract awards are behind us. Vendors will have to execute outside the US to capture significant growth opportunities.

The market in North America, especially for electric meters, is maturing and we expect growth to slow. Following the stimulus awards, large North American contract awards are behind us, according to leading providers, Itron and Elster. While the market will continue to see adoption, driven by smaller contract awards and steady adoption within the gas and water markets, the accelerated growth trends from prior years are unlikely to be replicated. We therefore believe vendors will need to execute outside of the United States in order to capture significant growth opportunities.

Steady Utility Adoption in Absence of Stimulus

In the United States, utilities are essentially regional monopolies with little incentive to transfer away from traditional technologies in the absence of a compelling cost savings or regulatory requirements. Simply put, there needs to be a compelling enough reason for a utility to deploy a technology that would get its customers to use less of its service. When a stimulus from regulatory authorities influences the cost decision, we are likely to see increased adoption. The general cycle for a utility goes as follows: companies offering smart grid solutions and advanced metering infrastructure (AMI) will approach utilities with a plan that shows the business case for why smart metering is attractive in a particular place. Different companies compete for a utility pilot with leverage in the hands of the utility. Upon approval from a utility, a company will roll out a pilot plan to show the cost and efficiency benefits surrounding upgrades to current infrastructure. If the pilot is successful, then utilities expand and implement a larger pilot. This cycle perpetuates, and with the coupling of government incentives to ensure utility cost recovery, pilot sizes grow and emerge more frequently.

Smart Grids: A Steady Upgrade Cycle

Rising electricity demand, aging infrastructure, and regulatory requirements driving better energy utilization have fueled desires by various countries to upgrade energy grid systems.

Factors such as rising electricity demand, aging infrastructure, and regulatory requirements driving better energy utilization have fueled desires by various countries to upgrade national energy grid systems. Advances in communications technology have prompted many across the energy landscape to support the development and deployment of smart grids; the ability to add monitoring, analysis, and communications capabilities to the national electrical grid. These technological advances are designed to better optimize the throughput of the system while providing upgrades to better manage energy consumption.

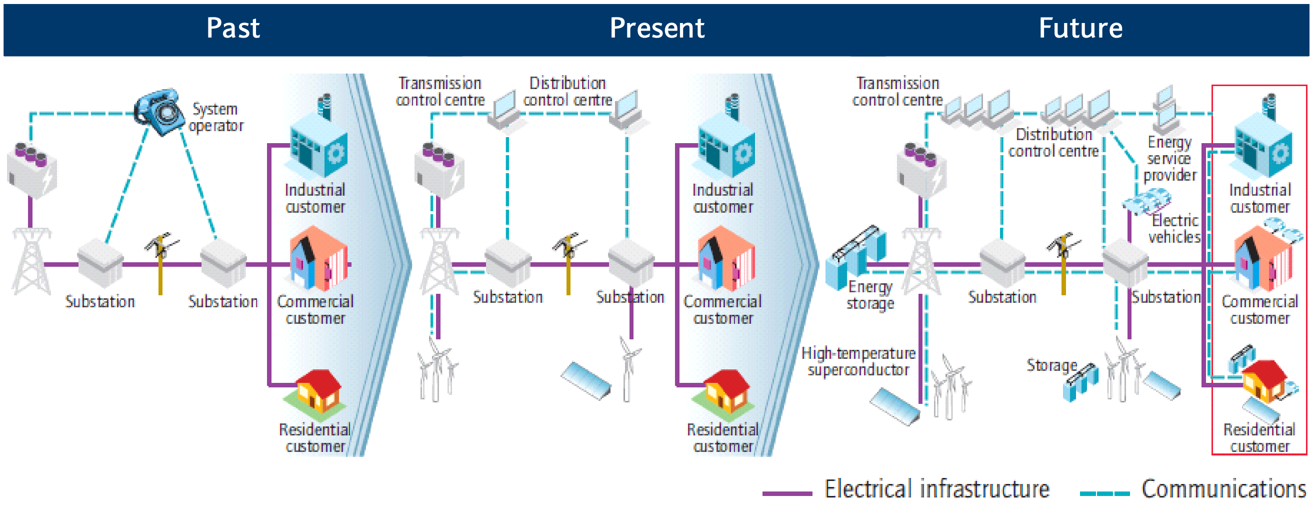
Smart Grid applications are designed to better optimize the throughput of the system while providing upgrades to better manage energy consumption.

Like most complex network architectures, the smart grid's ability to deliver its goal of improved energy management depends on information gathering, transmission, computation, interpretation, and utilization for multiple points of the network. In other words, the Smart Grid is a concept of applying digital technology to the power sector. Digital technologies have been integral to the modernization of many business sectors and have offered multiple degrees of efficiency and reliability. A general misconception shared by many involved with smart grids, is that a smart grid's most important component is the smart meter technology. However, a true smart grid is vastly more, consisting of a suite of technologies that can improve the performance, reliability, and controllability of the electrical grid.

We believe that advances to smart grid technologies are still at early stages as most countries are in the beginning stages of upgrades and utilities are largely developing pilot projects.

Overall, we believe that advances to smart grid technologies are still at early stages. Most countries are in the beginning stages of their upgrade cycles and utilities are largely developing pilot projects to test the economics of the technology. The United States and Europe have been the most aggressive with targets and have incentivized the technology with grants and subsidies. We expect the transition to be gradual as utilities are generally slow adopters of technology and inherently risk averse.

Figure 72: Electric System



Source: International Energy Agency (IEA)

Understanding Power Delivery Networks

Understanding the Power Cycle

The process for collecting usage/payment data is often inaccurate, thus providing opportunities for efficiencies to emerge.

According to the Department of Energy, the electric power industry generates annual revenues of $300 billion and maintains assets worth more than $800 billion. In the traditional grid, power plants generate electricity using coal, nuclear, or renewable sources of power. Once power is generated, a utility prepares it for delivery using a transformer that increases the voltage for transmission. Transmission lines then carry the electricity across long distances to distribution sites at neighborhood substations, which then lower the voltage. From this point, pole-top transformers prepare the power for end-user consumption. At the end of a payment cycle, utility companies manually gather consumption data from meters on houses and bill end users accordingly. This process is sometimes inaccurate as utilities often approximate usage based on historical levels and make adjustments on upcoming invoices for any billing corrections.

A Utility's Perspective

Naturally risk-averse utilities need a compelling value case to deploy technologies that may interrupt or impact their current business models.

From the perspective of utilities, smart meter adoption isn't simply about employing the newest technology; in fact, there are a number of factors a utility considers before even considering a pilot.

- **Smart Metering is not a near-term priority:** Utilities are consistently managing high capex projects that require a considerable amount of time and human capital. Recently, utilities have been more involved in deploying capital to improve and upgrade aging transmission lines and gas pipelines to ensure the safety and reliability of its energy. Meter rollouts are often at the bottom of the priority list for utilities unless costs can justify a strong business case. This is not to say utilities aren't supportive of rollouts, but rather, a compelling case must be made to lift smart grid upgrades up the list of many other priorities.
- **Viable business case is a must:** In the absence of the recent government incentives and mandates, utilities are unlikely to accelerate deployments without justifiable economics. Utilities are interested in direct OEM and capital savings with payback periods generally

around five years for any metering plan. In today's market, payback periods for large-scale AMI deployments range anywhere from three to five years depending on the cost of power, labor, and the regulatory framework. We also note that utilities are fairly risk averse in deploying new technologies, particularly in the event they impact their customer relationships or spark regulatory ire.

- **Decoupling fosters growth:** In U.S. energy markets, utilities' revenues depend on the amount of energy produced and delivered to the end users — which naturally makes utilities averse to conservation and energy-efficiency efforts, despite some inherent costs savings, because implementation cuts into profits as consumers become more efficient energy users. In other words, utilities are paying for people to use less of their product. Decoupling mitigates this concern by removing the relationship between revenues and sales volume. When revenues are "decoupled" from sales, utilities receive stable revenue regardless of sales volume. California, New York, and most of New England and Michigan are among states that are decoupled, and unsurprisingly have been the markets that have been at the forefront of smart meter adoption.

Traditional Grid

The traditional power grid is the infrastructure that transports electricity from the place where is it generated (coal plants, nuclear plants, renewable plants) to the end user (residential, industrial). To the average consumer, the most apparent components of the grid are the transmission lines in neighborhoods. In the traditional grid, the power generation is typically centralized and the power flow is in one direction. There is no two-way communication between the end user and the grid. Utilities generally send power based on load and historical consumption levels. One-way communication inhibits utilities from adjusting power levels during times of excessive or diminishing power consumption. Additionally, traditional grids provide limited accessibility for incorporating non-traditional energy sources making it more difficult to integrate renewable energy to the end users.

Electrical Infrastructure Landscape

According to the International Energy Agency (IEA), electrical infrastructure will need a $13 trillion investment worldwide by 2030 to upgrade facilities and technologies from current standards.

According to the International Energy Agency (IEA), electrical infrastructure will need a $13 trillion investment worldwide by 2030 to upgrade facilities and technologies from current standards. The catalyst for these upgrades is a combination of current technology in place and governmental initiatives to optimize electrical throughput while nationalizing resource use. The current technology was designed at a time when energy prices were low and the primary goal was simply to deliver power. However, with increasing energy prices and inconsistencies between power generation and consumption, electrical infrastructure may need to be modernized to become more energy and cost efficient. Additionally, rising energy costs have developed demand for renewable energy sources and governments have enacted targets and initiatives in order to increase energy security and decrease dependence on traditional energy sources.

The Smart Grid

What Makes a Grid Smart?

The primary difference between smart grids and traditional grids is the two-way communication capability of the technology between the grid and end user for improved energy management.

A smart grid is a digital energy system that delivers power from generation sources to end points of consumption. The primary difference between smart grids and traditional grids is the two-way communication capability of the technology between the grid and end user for improved energy management. Two-way communication is important as it provides more accurate information about transmission flows, enabling utilities providers to optimize power generation and delivery. In other words, the development of smart grid technology can minimize costly power disruptions by transporting only the amount of energy required. This lowers costs for utilities, allows for better end user energy management, and results in reduced carbon emissions as less energy is wasted than in the traditional grid.

The advent of renewable technologies over the last decade has the potential to put the stability of a traditional energy system at risk even at low penetration levels. The reason for this is because many traditional grids are not interconnected, making it more difficult to source energy from multiple generation sites. However, a smart grid offers full and efficient grid accessibility giving the transition to renewables, distributed generation, electrified heating and the shift toward electric vehicles some much needed stability. The reason for this is as electric vehicles enter the market place, demand for electricity intensifies and traditional grids are less likely prepared for this. The smart grid can help pave the way for accelerated growth and development of the electric grid.

Utilities process the data from their users and can generate solutions to mitigate energy waste and unnecessary costs.

The second prong of the smart grid revolves around the idea of what to do with the data generated from two-way communications. Utilities process the data from their users and can generate solutions to mitigate energy waste and unnecessary costs. Utilities can also manipulate their energy load factor to accommodate seasonal demand patterns during peak consumption times.

Market Potential

The projected global smart grid market will be worth $171bn by 2014 up from $69bn in 2009.

According to Zpryme Research & Consulting, the projected global smart grid market will be worth $171.4 billion by 2014, up from $69.3 billion in 2009. We believe that this growth will be primarily fostered by expansion in the United States, Europe, and developing or developed cities in the emerging markets. The transition to smarter infrastructure can be attributed to three catalysts: 1) utilities are increasingly finding the need to modernize their infrastructure to detect any energy outages, leakages, and faulty equipment, 2) governments are incentivizing utilities to explore interoperable standards so that renewable energy can be seamlessly integrated into the grid, and 3) growth in developing construction markets (e.g., Dubai, Brazil, India) requires new out-of-the-box infrastructure as opposed to replacements of traditional meters like in most places.

Figure 73: Smart Grid Benefits by Stakeholders

Governments and Regulators: - Adherence to international renewable energy targets and standards - Decreased dependency on combustibles by way of alternative energy sources for power generation - Improved spending efficiency on national infrastructure	**Strategic Partners/Vendors:** - Opportunity to enter new markets - Development of new technologies through shared R&D and resources with strategic partners - Cost of delivery reduced through demand for massive deployments
Utilities: - Wider portfolio of potential energy sources - Grid efficiency, reliability, and understanding of flow yielding improved operations - Transition from commodity provider to energy services provider - Fewer outage and blackout costs - Dependence on machine-to-machine platform and technology and reduction in human error	**Consumers:** - Greater transparency with energy consumption and billing information - Energy cost reduction by way of detailed pricing during peak and off-peak hours - Access to clean technologies and potential carbon savings - Fewer billing errors and more reliable payment system

Source: Barclays Capital, World Economic Forum.

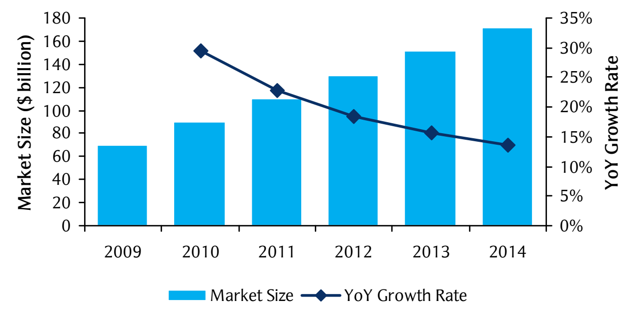
Upgrading from one-way to two-way communications is the first real step in transitioning to the smart grid. As a result, in order to measure the expansion of the smart grid market, we will primarily take a look at data revolving around meters, deployment, and pilots.

Meters – The Largest Component

Metering companies provide the best exposure for investors looking to play the smart grid upgrade cycle.

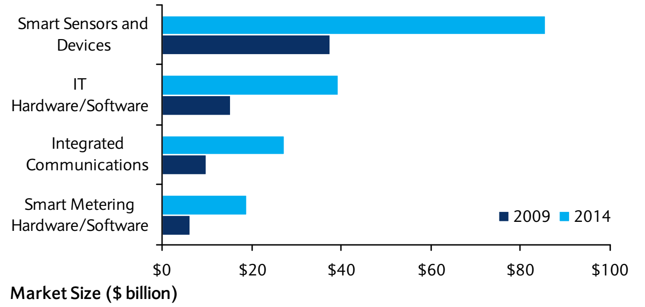
As previously highlighted, the premise of a smart grid is predicated on the ability for a complex network of devices to provide information to utilities to optimize energy utilization and delivery. According to Zpryme, the largest component of smart grid architecture is the meters, representing almost 50% of the entire market at $85.5 billion by 2014E.

Figure 74: Projected Global Smart Grid Market Size



Source: Zpryme Research & Consulting

Figure 75: Projected Global Smart Grid by Technology



Source: Zpryme Research & Consulting

Traditional Meters

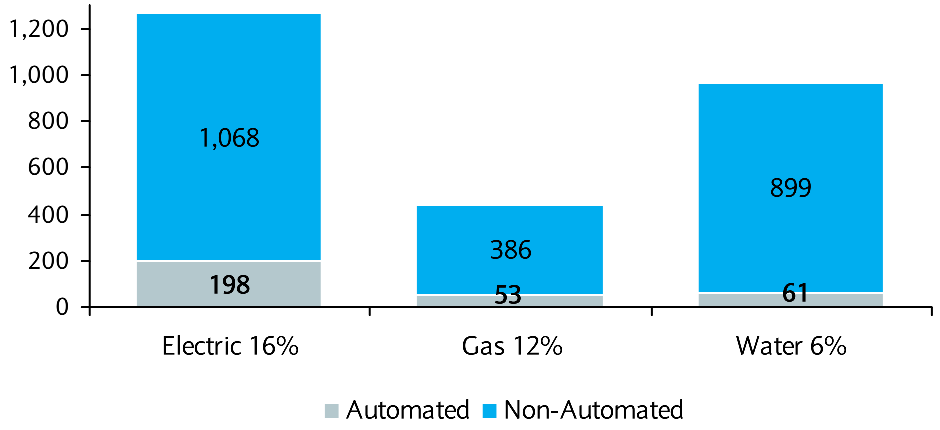
The traditional meter measures electricity as it enters a household or facility running a small motor to display power consumed on a dial or series of dials. Traditional meters date back decades and haven't changed materially since. These non-automated meters require periodic trips to the physical meter site in order to record a reading for billing and consumption data purposes. Of the 2.7 billion meters worldwide, 88% are non-automated, according to metering vendor Itron.

Automatic Meter Reading (AMR)

AMR is the first step taken to improving data collection by reducing the need to collect information directly from each site.

As an improvement from traditional meter reading, automatic meter reading (AMR) is the technology of collecting consumption data from water, electricity, or gas meters and transmitting that data to a central site for billing, troubleshooting, and analyzing. The one-way communication technology is largely used to save a utility employee's time and costs associated with physically going to each site and manually reading meters. Instead, many utilities drive vans around areas to collect data from meters via radio frequency or have some other type of communications network in place. Additionally, the use of traditional metering meant that utilities would estimate billings and offer adjustments in subsequent bills. With AMR, utilities can provide more accurate usage levels to make billings to consumers as accurate as possible. Some countries are transitioning from traditional meters to AMR, while more developed and aggressive countries are transitioning from AMR to AMI.

Figure 76: Global Smart Meter Adoption (millions)



Source: Itron

Advanced Metering Infrastructure

Advanced IT software and hardware systems are necessary for analyzing and processing the information.

Advanced Metering Infrastructure (AMI), an integral piece of the smart grid system, are systems that analyze and collect energy consumption and communicate it with metering devices such as electricity, water, gas and heat meters by request or on a schedule. This type of technology provides consumers with the ability to use energy more efficiently and offer utilities the ability to detect problems and inconsistencies with energy flow or infrastructure and operate them more efficiently. The eventual goal is to use AMI to enable demand response, which is when consumers use information provided by their system/utility to adjust consumption patterns to take advantage of peak and off-peak pricing differentials. AMI differs from AMR in that AMI enables two-way communications with the meter.

The Infrastructure

The three major components of AMI are smart devices, two-way communications, and advanced software. Smart devices, manufactured by companies like Elster and Itron among others, are meters, monitors, and other intelligent devices that gather information about the flow and consumption of power and the condition of the instrument. The condition of the instrument is significant because inaccurate readings could result in inefficient uses of energy, potential power outages and inadequate data management. Smart meters enable consumers to understand their energy consumption levels while offering operational and asset management data to utilities. This type of two-way communication allows customers to be involved in the smart energy system and provides the opportunity for high and low volume pricing and demand response which are tools to manage load profiles and control overall energy consumption. The global market for smart metering hardware and software and associated smart sensors and devices is expected to reach $105 billion by 2014 (from $44 billion now) according to Zpryme Research and Consulting.

AMI introduces two-way communication in order to generate real time data collection while reducing associated costs.

Following data collection, the smart devices send information over a two-way communications channel. Utilities typically use radio frequency communications similar to Wi-Fi networks in the United States and power line communications over electric power lines in Europe. Other technologies used by utilities include satellite, fiber-optic, cellular or some type of hybrid of these. The market for smart grid integrated communications is expected to reach $27.4 billion by 2014 (from $10 billion now) according to Zpryme Research and Consulting.

Finally, advanced IT software and hardware systems analyze the data for billing, customer services and grid operational purposes. A smart grid is generally equipped with functionality from end to end that can monitor, report back, and accept instructions. As a result, system operators can predict and mitigate potential future blackouts and outages. The upside to the end user is more control over consumption and associated costs. The market for advanced IT software and hardware is expected to reach $39.4 billion by 2014 (from $15.2 billion now) according to Zpryme Research and Consulting.

Figure 77: Competitive Landscape Along Value Chain

	Meters	Communications	Meter Data Management
Hardware and Subsystems	Chips/Components - Ember Networks - Digi International - Zensys - Teridian - Freescale - Accent	Chips/Equipment - Texas Instruments - Sierra Wireless - Qualcomm - Motorola - Cisco - Alcatel - Nokia Siemens	Servers/Database - Oracle - Microsoft - IBM
Systems and Software	Systems/Units - Itron - Landis+Gyr - Sensus - Elster - GE	Systems - Silver Spring - Trilliant - Itron - Landis+Gyr - Sensus - Elster - GE - Aclara	Software/Applications - Itron - Elster - Oracle - eMeter - Ecologic Analytics - Alcara - Tibco
Services	Services/Install - Corix - UPA - VSI	Network Operators - AT&T - Verizon - T-Mobile - Sprint	Systems integrators - IBM - Accenture - Cap Gemini

Source: Cleantech Group, Barclays Capital

Government Stimulus a Key Driver of the Global Smart Market

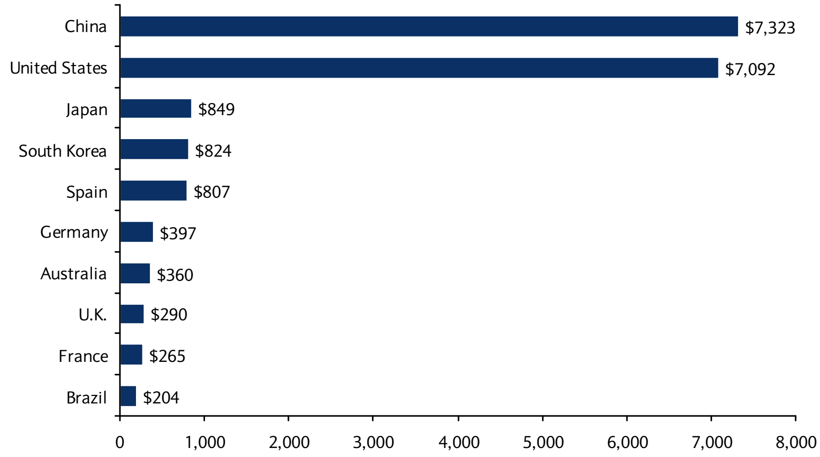
Globally, various governments have been providing utilities with incentives to invest in smart grid upgrades.

Like with most clean energy initiatives, transferring from current technologies to more expensive technologies requires a sizeable investment. If there is no immediate reason to upgrade technologies, governments often find themselves incentivizing these transitions. In the global smart market, one of the most important drivers is government stimuli.

China was no.1 in smart grid federal stimulus spend in 2010, investing over $7.3bn.

China topped the rest of the world in smart grid federal stimulus spend by investing over $7.3 billion in 2010, followed by the United States, which was a close second investing $7.1 billion. While the opportunity is still growing in both regions, an emerging opportunity that is still in the early stages of the meter replacement cycle is Europe. Besides Spain, which invested $800 million in smart grid and related technology, the rest of the European countries invested less than $400 million each in 2010 led by Germany. While China undoubtedly led Asia, Japan and South Korea are both actively engaged in renewing infrastructure, spending $849 million and $824 million, respectively. Additionally, in September 2011, the Asian Development Bank announced that it will lend India $750 million for its national grid infrastructure improvement projects.

Figure 78: Federal Smart Grid Stimulus Spending by Country, 2010 ($ mn)



Source: Zpryme Research & Consulting

The North American Market

The North American market has been at the forefront of the smart grid deployment cycle.

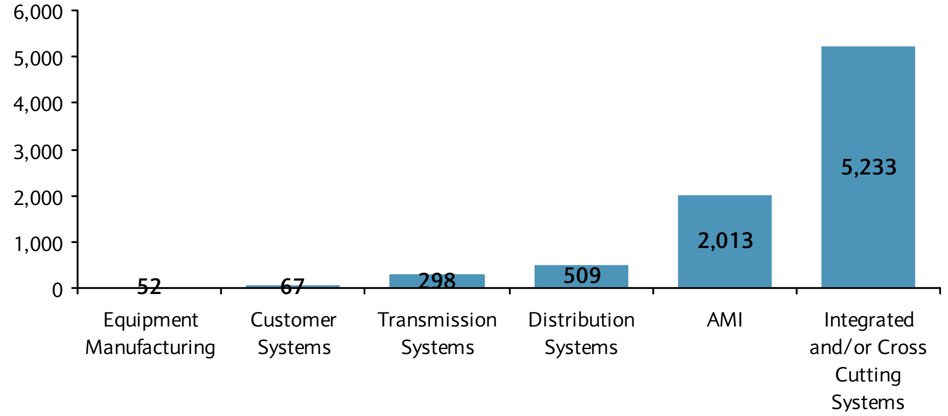
The opportunity in North America is further along the deployment cycle than in any other region in the world. Progress in deployment is generally a function of three factors: 1) government incentives and targets, 2) utilities' willingness to adopt new technologies with potentially more attractive long-term cost structures, and 3) smart grid venture capital spending.

Government Involvement

The DOE's 2009 stimulus grant of $8bn was a key driver of regional upgrades.

Initially sparking deployment in North America, government stimuli has paved the way for the advancement of energy infrastructure. In 2009, the Department of Energy (DOE) announced a $3.4 billion stimulus grant to 100 smart grid projects providing grants ranging from $50,000 to $200,000 for smart grid technology resulting in a project dollar value of $8.17 billion. Additionally, the DOE distributed grants ranging from $100,000 to $5 million for the deployment of grid monitoring devices. In addition to expected the $1.8 million smart meter installations, funded projects are also expected to deliver 200,000 advanced transformers, 700 automated substation systems and 850 transmission grid sensors to manage the delivery of power. Another push in North America is led by initiatives on a state level. The market penetration in certain states is far greater than the national average with Arizona, Oregon, and Idaho leading the pack reaching about 25% according to the Federal Energy Regulatory Commission. Texas and California are also making headway due to state-level targets.

Figure 79: Total Value of Projects Funded by U.S. Smart Grid Stimulus ($ mn)



Source: Zpryme Research & Consulting, DOE

Figure 80: Total Value of Projects Funded by U.S. Smart Grid Stimulus in 2010 ($ mn)

Smart Grid Segment	Total Projects	Gov't Grant Amount	Private Sector Contribution	Total Project Value	Percent of Total
AMI	31	818.2	1,194.3	2,012.5	24.6%
Customer Systems	5	32.4	34.9	67.3	0.8%
Distribution Systems	13	254.3	254.7	509	6.2%
Transmission Systems	10	148	150.5	298.4	3.7%
Equipment Manufacturing	2	25.8	25.8	51.6	0.6%
Integrated and/or Crosscutting Systems	39	2,150.5	3,082.4	5,232.9	64.0%
Total	100	3,429.2	4,742.6	8,171.8	100%

Source: Zpryme Research & Consulting, DOE

Adoption by Utilities

Risk-averse utilities generally prefer a steady adoption cycle when it comes to deploying new technologies.

The general cycle for a utility goes as follows: companies offering smart grid solutions and AMI will approach utilities with a plan that shows the business case for why smart metering is attractive in a particular place. Different companies compete for a utility pilot with leverage in the hands of the utility. Upon approval from a utility, a company will roll out a pilot plan to show the cost and efficiency benefits surrounding upgrades to current infrastructure. If the pilot is successful, then utilities will consider expansion and implement a larger pilot. Utilities often prefer working with multiple meter solutions vendors so that they don't have to depend on just one company. This cycle perpetuates and with the coupling of government incentives to ensure utility cost recovery, pilot sizes grow and emerge more frequently. In the North American market, utilities are beyond the pilot phase and are beginning to proactively design AMI and smart grid upgrades for larger scale deployments.

Sometimes, a risk-averse utility has little incentive to upgrade because of the capital expenditure involved and the view that "if it ain't broke, don't fix it." The logic is that if a traditional meter works and there is no legislation mandating upgrades, then why spend the extra capital to improve infrastructure. In fact, it cost California's Pacific Gas and Electric (PG&E) company $2.1 billion to install 7.9 million meters according to the May 2011 PG&E SmartMeter Steering Committee Update. However, long-term cost-benefits do make the business case for upgrades attractive. The reason for this is two fold: 1) costs during power interruptions are expensive for both the end user and the utility, and 2) better energy management often results in reduced generation costs. Energy security is another concern to utilities as a typical network connects millions of endpoints. Utilities understand that an upgrade means more efficiency with power generation and better response to fluctuations in energy demands. Figure 81 below shows the average cost for one hour of power interruption to various industries.

Utilities actively involved in the smart grid upgrade cycle in North America include PG&E, Southern California Edison, San Diego Gas and Electric, Arizona Public Service, Salt River Project, and CenterPoint. These utilities account for the majority of installations in North America to date.

Figure 81: Average Cost for One Hour of Power Interruption

Industry	Amount
Cellular Communications	$41,000
Telephone Ticket Sales	$72,000
Airline Reservation System	$90,000
Semiconductor Manufacturer	$2,000,000
Credit Card Operation	$2,580,000
Brokerage Operation	$6,480,000

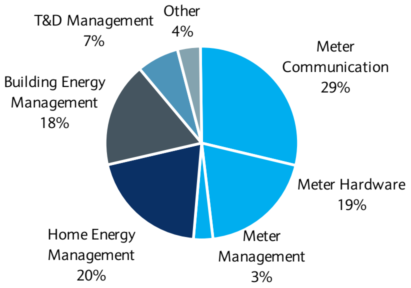
Source: Department of Energy

Smart Grid Venture Capital Spending

Smart Grids have been one of the key areas for venture investing in the smart grid space.

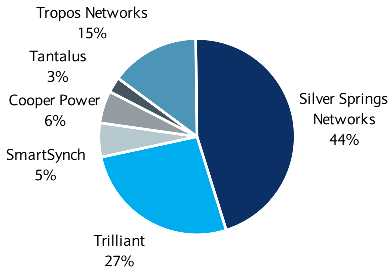
Besides government spending, one of the larger catalysts for the upgrade cycle, and the greater clean technology space, in North America has been smart grid venture spending. Metering companies stand to gain the most from this as 50% of the $1.68 billion in venture spend in smart grid firms has gone to metering companies. The communications portion of the smart grid has also seen a sizeable level of investments. These are led by Silver Springs Networks and Trilliant, which raised approximately $250 million and $150 million, respectively.

Figure 82: Smart Grid Venture Spending 2007–10 - $1.68bn



Source: Cleantech Group, DOE

Figure 83: Communications Venture Spending - $550mn



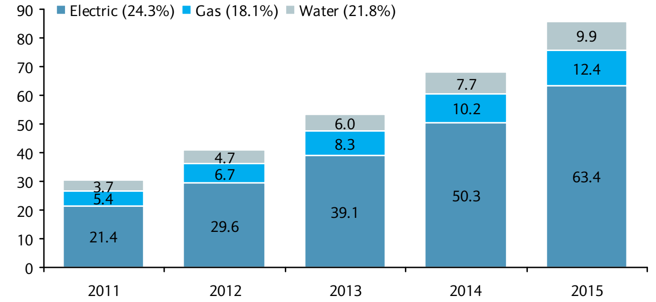
Source: Cleantech Group, DOE

Metering Landscape

With respect to market cycles, the global market rests in different areas. The opportunity in North America is in AMI development and the shift toward two-way metering as the overall AMR market begins to reach a point of relative maturity.

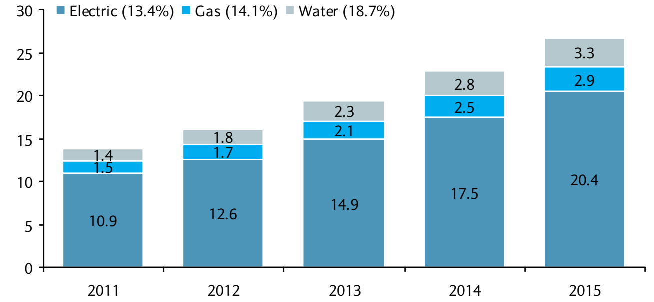
The meter market is broken down into three major energy sources. While other meters do exist, the market typically revolves around electric, gas, and water meters. In the North American market, electric meters capture an overwhelming majority of meters deployed and will remain ahead of gas and water. According to Zpryme, the projected annual installed base of meters will grow at a CAGR of 23% through 2015 divided between electric, gas, and water, representing CAGRs of 24.3%, 18.1%, and 21.8%, respectively.

Figure 84: Projected US Installed Base of Smart Meters in millions (CAGR)



Source: Zpryme Research & Consulting

Figure 85: Project U.S. Annual Shipments of Smart Meters in millions (CAGR)



Source: Zpryme Research & Consulting

Currently, the largest market for smart meter deployment is the electric market. In North America, there are currently around 21 million AMI endpoints. Because of its already established presence, electric metering shipment growth will slow relative to gas and water meters, in our view. The key drivers for the electric market are accurate and real time data collection, two-way communications between energy sources and end users, and overall reductions in cost structures for both sides of the value chain. We can expect to see increasing gas and water project pilots in North America as efforts shift from solely electric upgrades to multi-resource upgrades.

Figure 86: US Market Value by Segment ($ mn)

	Electric	Gas	Water	Total
2011	$1110.2	$138.6	$86.5	$1335.3
2012	$1249.2	$164	$108.3	$1521.5
2013	$1429.8	$187.7	$134.5	$1752
2014	$1622.7	$213	$161.7	$1997.4
2015	$1841.6	$243	$186.7	$2271.3
CAGR	**10.7%**	**11.9%**	**16.6%**	**11.2%**

Source: Zpryme Research & Consulting

The European Market for Smart Meters

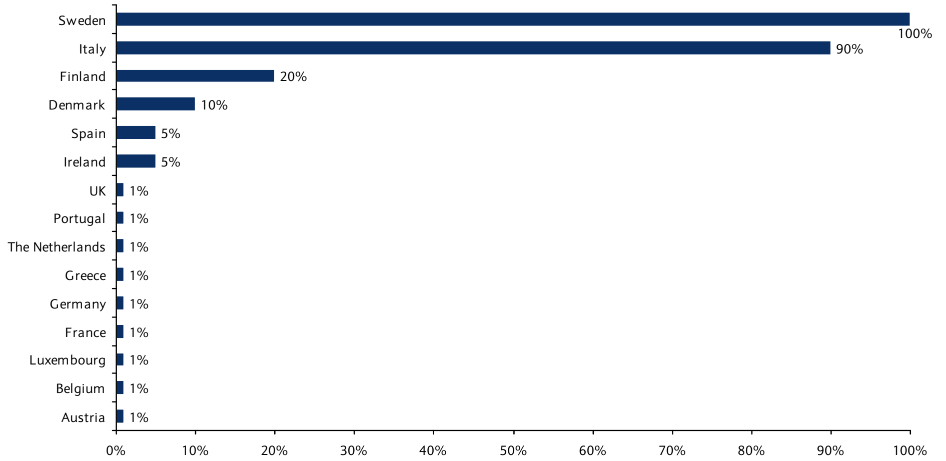
With 145 million meters requiring upgrades, we believe Europe is the next largest upgrade opportunity for smart grid vendors.

From a cycle perspective, Europe is the next emerging growth opportunity. The opportunity in Europe is largely composed of a shift away from traditional metering toward one-way metering. The market development has been primarily hardware and technology driven with the integration of renewables providing a catalyst. There are also some developing pilot projects exploring AMI as well. According to Frost and Sullivan, the European smart grid market generated revenue of $5 billion in 2010 and will grow at a CAGR of 21% through 2015.

In Europe, most countries prefer to begin with a proof of concept followed by small-scale pilot programs and eventually larger scale pilots. If the business case for upgrades continues to remain strong, utilities will consider implementation in small sections of the grid. In some European countries, the shaky economic environment makes long-term energy investments somewhat unattractive in the near-term. Many utilities in European countries are in different stages of the cycle with only a handful investing in AMI.

Italy, Malta, and Sweden have been the most aggressive in Europe with respect to a country-wide, large-scale smart grid. However, we expect the EU Directive to be a longer term driver for implementation. Countries that have already taken steps toward reaching the target are France, Denmark, Spain, Ireland, Greece, and the UK.

Figure 87: Smart Metering Penetration by Country, 2010



Source: Frost and Sullivan, Enerdata

There are three catalysts driving further deployment in Europe:

- The EU 2020 Directive driving long-term growth,
- Emerging large-scale deployment pilots by energy companies driving near-term growth, and
- Overall grid improvements to integrate renewables.

The EU 2020 Directive

The EU directive is targeting 80% smart meter deployment by 2020 and 100% by 2022.

The EU 2020 Directive sets several clean energy targets for the European Union. The EU plans to reduce greenhouse gas emissions by at least 20% from 1990 levels, improve energy efficiency by 20%, raise the share of renewable energy by 20% and increase the level of biofuels in transport fuel by 10%.

On the metering front, the EU Directive aims to reach 80% smart meter deployment by 2020 and 100% by 2022. This converts to an upgrade of 145 million meters by 2020, and as a result we can expect to see an increasing number of pilots as Europe begins to transition to the two-way meter. Because of economic concerns in Europe, our checks suggest that the initial pace of development may be somewhat flat through 2012. One of the more significant headwinds in Europe is the inconsistency in technology and the potential to build out infrastructure. However, by 2013, we expect to see increased order flow as a result of countries racing to meet their 2020 targets. This will spike demand for meters and utilities will roll-out new pilots more aggressively, in our view.

Steady Growth of Pilots

Service providers such as France's ERDF and Italy's Enel have already been very active in smart grid.

While the EU 2020 directive as the longer-term driver for deployment in Europe, utilities' attempts to establish a strong business case for upgrades will drive the near term, in our view. In Europe, most countries prefer to begin with a proof of concept followed by small-scale pilot programs and, eventually, larger scale pilots. If the business case for upgrades continues to remain strong, utilities will consider implementation in small sections of the grid. In some European countries, the shaky economic environment may make long-term energy investments somewhat unattractive in the near term. Many utilities in European countries are in different stages of the cycle with only a handful investing in AMI.

We are seeing a steady growth of pilot programs involving multiple meter companies in the European pipeline. Spain's Iberdrola, Italy's Enel, and France's ERDF (Electricite de France) have all been some of the more active European utilities announcing pilot programs.

Integration of Renewables and Grid Improvements

Mandated increased contribution from renewables may require additional upgrades to regional energy grids.

In order to satisfy the 2020 directive, 20% of electricity generated has to be sourced from renewable plants. However, traditional grids provide limited accessibility for incorporating non-traditional energy sources making it more difficult to integrate renewable energy to the end users. As a result, there are inherent catalysts in the market place to improve grids for renewable energy market share gains. Finally, from a consumer perspective, pilot programs are increasing because smart gird concepts are well received by end users. Customers seem to attach value to programs that integrate renewable energy sources implemented by established companies.

Emerging Markets

Despite concerns around infrastructure, energy theft, and costs, the emerging markets are beginning to explore smart grids.

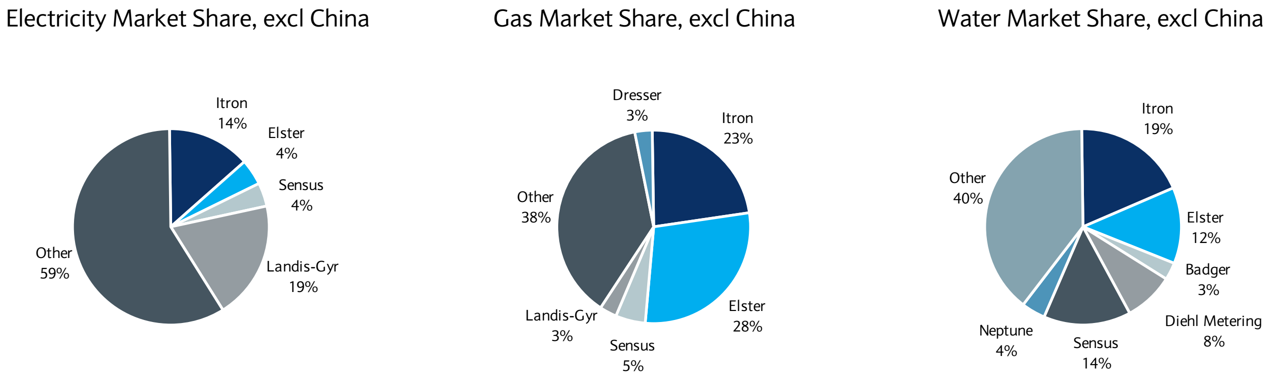
- **China:** The Chinese government is investing heavily in smart meter projects throughout the country led by the State Grid Corporation of China (SGCC). The SGCC controls over 85% of the Chinese electricity market and plans to invest approximately $600 billion in improved energy distribution and transmission through 2020. However, China is a difficult market to penetrate for a lot of the non-Chinese metering and solutions players because the Chinese government heavily favors domestic metering companies. Another challenge in China is the vast difference between rural and urban areas. Deploying AMI infrastructure in some rural areas in China doesn't make sense from an economic perspective because of usage, payment, and proximity concerns. Even so, China is looking to automate 50 million meters over the next three years.

- **Latin America:** There is a sizeable amount of demand collectively coming from Brazil, Mexico, and Argentina. These regions have a good heritage in electric and gas and are continuing to invest at a moderate pace. One-time events often provide a catalyst for development in these regions. The World Cup in 2014 and Olympics in 2016 in Brazil are going to be drivers for improved energy security and infrastructure in Brazil.

- **Middle East:** As the Middle East develops its mega-cities (e.g., Abu Dhabi, Dubai), gas and water metering could gain strength as the region heavily invests in the growth and construction of its advanced infrastructure.

The Metering Landscape

Figure 88: Global Market Share: Smart Meters


Electricity Market Share, excl China

Gas Market Share, excl China

Water Market Share, excl China

Source: Itron

Electric Meters

The electric meter market is the largest sub-sector and thus the largest upgrade opportunity for smart grids.

Currently, the largest of the three major meter markets for smart meter deployment is the electric meter. The key drivers for the electric meter market are energy security and smart communications for real-time data management. By transitioning over to smart meters, utilities can ensure more reliable energy security, which in turn leads to cost reductions. A typical network connects millions of endpoints. Utilities understand that an upgrade means more efficiency with power generation and better response to fluctuations in energy demands. The cost to utilities and businesses associated with power outages are high and any improved energy security can reduce unnecessary operational costs. Second, open two-way communications can allow utilities and consumers to better manage power usage. Utilities process the data from their users and generate solutions to mitigate energy waste and minimize costs. Utilities can also manipulate their energy load factor to accommodate seasonal demand patterns during peak consumption times. With precise real-time data on energy consumption, utilities can better manage demand with existing capacity and avoid additional material costs of building new capacity.

Gas Meters

Gas typically lags electric meters in timing, but resembles electric metering with respect to its growth and deployment trajectory.

The cycle for meters begins with electric followed by gas. Gas typically lags electric meters in timing, but resembles electric metering with respect to its growth and deployment trajectory. The key drivers for gas meters are the current combustible energy environment and consumption safety for end users. Natural gas has emerged as a viable near-term alternative to energy supply concerns and the IEA has called this the “golden age of gas.” Gas is relatively abundant and can be used in a variety of applications. As more commercial and residential end users consume gas, the demand for meters will naturally rise. Italy has been the most active in gas meter deployment and we can expect other European governments to implement similar standards.

Additionally, the risk inherent in transporting natural gas is greater than with electricity and smart meters can mitigate some of that risk. With a traditional gas leak, a consumer will smell the gas and call his/her gas company. The gas company will tell the consumer to leave the house, and a truck will come 40 minutes later to appease the situation. With gas meters and associated solutions, utilities will be able to shut off gas to the source, immediately mitigating any health risks. Basically, any gas leak or irregularity in consumption patterns is likely to be proactively detected by utilities curbing issues more efficiently. The same can be said about gas outages.

From a utility perspective, gas meter deployment is less necessary as the cost benefit is lower because gas usage is entirely seasonal. Since seasonality enables utilities to forecast gas consumption, having advanced meters to prevent outages is not an immediate necessity. In fact, many utilities today still estimate gas usage.

Water Meters

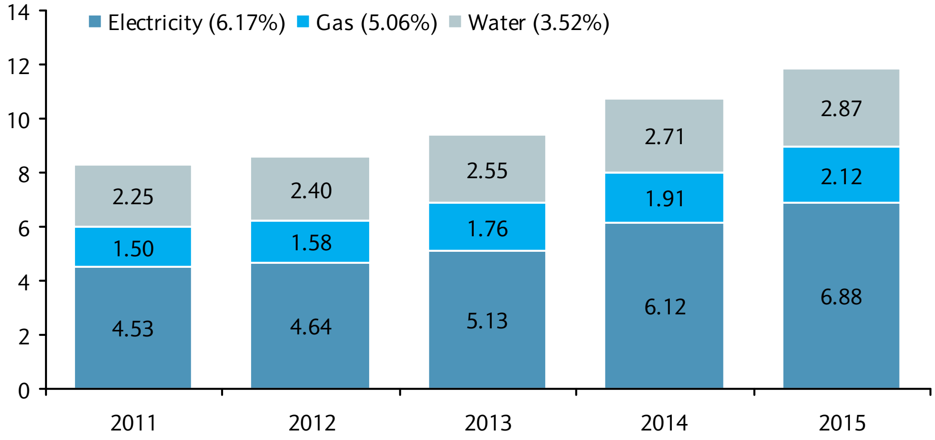
In our view, the inherent complexities of water delivery as well as the end market make the water market the slowest to adopt smart grid technologies.

According to the U.S. geological survey, **only 3% of the world's water is fresh water, and of that, only 0.3% is directly accessible for human use**, with rainfall serving as the only replenishment to aquifers, glacier, and freshwater pools. The water cycle is unpredictable and the entire water distribution system is a capital- and equipment-intensive industry consuming high levels of energy. According to IMS Research, the total water meter market in 2010 was worth $2.1 billion, made up of 85 million meters. This number is expected to reach almost $3 billion by 2015, made up of around 120 million meters. IMS Research expects the global smart water market to grow at a CAGR of 11% through 2015.

We believe there are three catalysts driving this growth. The first is water conservation, the second is leak detection, and the third is cleaner water. Global water supply is fixed and utilities are beginning to implement AMR and AMI technology to ensure that consumers are efficiently using water with waste minimization. Additionally, wasted water is an unnecessary cost to utilities from a supply perspective and consumers from a billing perspective. Instead of reporting a leak or waiting to even indentify a leak, utilities can track water consumption on a real-time basis and isolate any irregularities in water consumption patterns. Finally, awareness about water impurities within the traditional brass or bronze water pipes is going to drive a shift toward new polymer meters. Old pipes often trap sediment into the water and have traces of lead exposure. With respect to the deployment cycle, water and gas projects generally grow at a similar pace.

From a utilities perspective, the water meter adoption cycle lags because of the inherent structure of the water business. In the United States, there are two major water companies that may adopt smart solutions (American Waterworks and Aqua America). However, the overwhelming majority of water companies are municipally or locally owned making project sizes relatively small.

Figure 89: Industry Revenue Growth by End Markets in $ millions (CAGR)



Source: Itron, IMS Report 2010

ELSTER GROUP SE (ELT; 1-OVERWEIGHT/2-NEU); PRICE TARGET $18

ELT

Stock Rating
1-OVERWEIGHT

Sector View
2-NEUTRAL

Price Target
USD 18.00

Price (08-Nov-2011)
USD 14.35

Potential Upside/Downside
+25%

Elster Group SE(ELT): Quarterly and Annual EPS (USD)

	2010	2011			2012			Change y/y	
FY Dec	Actual	Old	New	Cons	Old	New	Cons	2011	2012
Q1	0.08A	N/A	0.27A	0.27A	N/A	0.26E	0.28E	237%	-4%
Q2	0.35A	N/A	0.27A	0.27A	N/A	0.29E	0.32E	-23%	7%
Q3	0.58A	N/A	0.27A	0.27A	N/A	0.32E	0.33E	-53%	19%
Q4	0.36A	N/A	0.30E	0.33E	N/A	0.35E	0.36E	-17%	17%
Year	1.37A	N/A	1.10E	1.13E	N/A	1.22E	1.26E	-20%	11%
P/E	10.5		13.0			11.8			

Source: Barclays Capital
Factset

COMPANY SNAPSHOT

Elster U.S. Clean Technology and Renewables

Income statement ($mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	1,759	1,876	1,923	2,024	4.8%
EBITDA	279	277	265	292	1.4%
EBIT	194	192	178	200	1.1%
Pre-tax income	119	128	154	183	15.6%
Net income	106	124	138	161	14.8%
Reported EPS ($)	1.37	1.10	1.22	1.41	0.9%
Diluted shares (m)	77	113	113	114	13.8%
Dividend per share ($)	-	-	-	-	NA

Margin and return data (%)					Average
EBITDA margin	15.9	14.8	13.8	14.4	14.7
EBIT margin	11.0	10.2	9.2	9.9	10.1
Pre-tax margin	6.7	6.8	8.0	9.1	7.7
Net margin	6.0	6.6	7.2	7.9	6.9
ROIC	11.4	11.0	10.7	12.6	11.4
ROA	4.9	5.9	6.2	6.8	5.9
ROE	16.2	16.9	16.2	16.2	16.4

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	203	194	162	128	-14.3%
Intangible fixed assets	1,153	1,132	1,132	1,132	-0.6%
Cash and equivalents	216	134	266	461	28.6%
Total assets	2,164	2,105	2,232	2,378	3.2%
Short and long-term debt	840	660	660	660	-7.8%
Other long-term liabilities	668	708	720	728	2.9%
Total liabilities	1,508	1,368	1,379	1,387	-2.7%
Net debt/(funds)	624	526	394	199	-31.7%
Shareholders' equity	656	738	853	991	14.7%
Change in working capital	14	2	15	(23)	NA
Operating cash flow	141	183	187	252	21.2%
Capital expenditure	42	50	55	58	10.7%
Free cash flow	208	163	241	310	14.1%

Valuation and leverage metrics					Average
P/E (x)	10.4	13.0	11.8	10.2	11.3
EV/EBITDA (x)	6.2	7.8	7.6	6.3	7.0
FCF yield (%)	18.8	10.0	14.9	19.0	15.7
Price/sales (x)	0.6	0.9	0.8	0.8	0.8
Price/BV (x)	1.7	2.2	1.9	1.6	1.9
Dividend yield (%)	0.0	0.0	0.0	0.0	0.0
Total debt/capital (%)	56.2	47.2	43.6	40.0	46.7

Selected operating metrics					CAGR
Gas Revenues	944	1078	1110	1178	7.7%
YoY Growth Rate	5%	14%	3%	6%	
Electricity Revenues	452	450	470	497	3.2%
YoY Growth Rate	0%	0%	4%	6%	
Water Revenues	384	380	376	382	-0.1%
YoY Growth Rate	8%	-1%	-1%	2%	

Source: Company data, Barclays Capital

Stock Rating	1-OVERWEIGHT
Sector View	2-NEUTRAL
Price (08-Nov-2011)	$ 14.35
Price Target	$ 18.00
Ticker	ELT

Investment case

With 50%+ of its revenues originating from outside North America, Elster is one of the best positioned meter vendors to capitalize on rising international smart meter deployments. Our $18 price target is based on 13x our CY13 EPS estimate of $1.41, in-line with ELT's historical average since its public debut in late 2010.

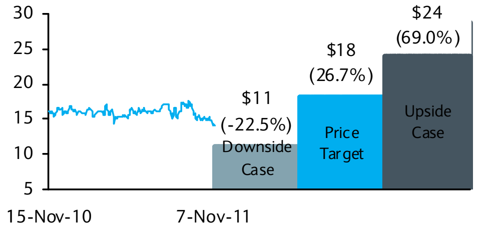
Upside case $ 24.00

Better than expected int'l meter deployments could lead to more normalized demand trends of 10%+ in 2H12 and beyond. Coupled with operating margin leverage suggests upside earnings power of $1.60 in 2013 and multiple expansion (15x) yields an upside case of $24.

Downside case $ 11.00

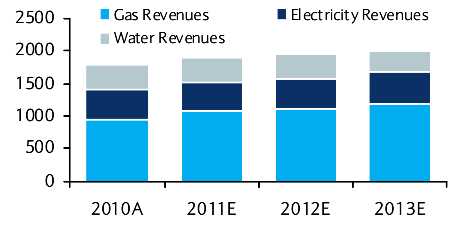
Steeper than expected declines in North America and a prolonged rollout of international smart grids could lead to a slower than expected recovery on ELT's top line. Assuming limited scope for margin expansion leads to downside earnings power of $1.10 and a downside case of $11.

Upside/downside scenarios



Source: FactSet

Revenues by Segment



Elster Group SE (ELT) – Initiating Coverage at 1-OW

We initiate coverage of Elster (ELT) with a 1-Overweight rating and $18 price target.

We initiate coverage of Elster Group SE (ELT) with a 1-Overweight/2-Neutral rating and $18 price target. With approximately 68% of its revenue coming from international markets (approximately 45% from Europe) we believe Elster is one of the better positioned smart-meter vendors to capitalize on the next wave of upgrades starting in 2H12E and beyond. While the company's net debt per share and limited float have both served as overhangs on the shares, we believe the company has improved its liquidity in recent quarters and expect healthy cash generation to support its business.

Our 2012 estimates reflect our expectations for continued growth in Elster's international business in part offsetting tepid demand in North America for the near term. Looking at 2H12 and into 2013, we expect the company to begin to benefit from the expected multi-year rollout of smart meters in Europe, driving accelerating top-line growth. While material margin expansion is unlikely, we do anticipate leverage on the company's operating line. Our 2012 and 2013 sales and EPS estimates are $1,923mn/$1.22 and $2,024mn/$1.41, respectively.

Our $18 price target is based on 13x our CY13 EPS estimate of $1.41, in line with the company's historical average since its late 2010 IPO. We look for multiple expansion from current trading levels of approximately 10x our CY13 EPS estimates as visibility on international smart-meter awards improves through the course of next year.

Company Description

Elster is a global provider of advanced and integrated metering solutions for the utilities industry.

Founded in 2005 and headquartered in Essen, Germany, The Elster Group (ELT) is a global provider of advanced metering infrastructure (AMI) and integrated metering and utilization solutions to the electric, gas, and water industries. The company can trace its heritage to New York's American Meter Company established in 1836 and Berlin's Elster Meter established in 1848.

Elster's products and solutions are used to measure the consumption of electricity, gas, and water as well as energy efficiency and conservation. Equipped with communication capabilities and applications, meters function as a link between the end user and the electric grid. Specifically, advancements in the company's technology are designed in order to enable smart grid infrastructure; that is, the modernization of the national electricity transmission and distribution system which allows the grid to predict and respond to fluctuations in energy consumption and help decrease generation costs and over-production of energy. The company considers its experience, length of service, and reputation the most valuable qualities for its customers. Elster has more than 200 million meters deployed in over 130 different countries. Relative to other meter manufacturers, Elster is the largest in gas, the second largest in water, and the third largest in electricity, globally. Elster completed its initial public offering in September 2010.

ELT – Investment Thesis

Multi-Year Infrastructure Upgrade Cycle

The combination of improved technology and lower-cost communications systems with increased regulatory initiatives to optimize natural resource usage are driving the need to upgrade grid infrastructure on a global basis. This should support a multi-year upgrade cycle in grid technologies, of which meters are a core part. Given the company's legacy relationships both domestically and internationally, we expect Elster to be a key beneficiary of meter upgrades in order to meet increasing regulatory requirements globally.

Well Positioned Across Key Markets

With customers in more than 130 countries, and leading share across key end markets, Elster is well positioned to capitalize on market growth opportunities. The company has a solid global footprint with approximately 45% of revenues from Europe, 32% from North America, and 23% from other markets.

Established Relationships Key

Elster's tenure in the metering business goes as far back as 1836 in New York and 1848 in Germany. Having established itself as a prominent meter provider by way of market share and market segment (gas, water, and electric), Elster has been able to develop and maintain strong ties to utilities. Utilities are typically risk averse with new technologies and projects and thus maintain an "if it ain't broke, don't fix it" attitude. Utilities, do, however value strong relationships with meter providers, and having an established installed meter base makes Elster an attractive metering company for utilities, in our view.

ELT – Investment Risks

Volatility in Project Announcements

Large contract awards often serve as positive catalysts for awarded vendors, and negative catalysts for non-awarded vendors. Conversely, any large award garnered by a competitor of Elster could pressure the stock. There is also an inherent variability and unpredictability in the flow of awards. Often, large project awards can be lumpy on a quarter-to-quarter basis leading to potentially volatile top- and bottom-line results.

Pace of Capital Spending by Utilities

Initiatives supporting the metering industry are supported by capital spending by utilities. Any negative impact stemming from the uncertain economic environment could lead to a tempered capital deployment environment negatively impacting Elster's revenue opportunities. Moreover, as utilities often look to pass along the cost of increased investment to their customers, many may be increasingly reticent to spend more in times of economic challenges, particularly if they hope to avoid regulatory scrutiny.

Limited Float Amplifies Risk

Elster currently has a net debt position of roughly $540 million. Any operational issues could be further exacerbated given its debt position. Elster has a debt-to-equity ratio of .93x. Moreover, with a limited float of 14%, we can expect volatility in the company's stock price given potential economic of company-specific uncertainties. The private equity firm that purchased Elster in 2005, CVC Capital Partners, still owns 61% of the company.

Our View

Overall, we believe an investment in Elster is an investment in the company's ability to capitalize on the next investment cycle in smart grids, largely beginning in Europe. In our view, the company is well positioned to capitalize on the next investment cycle in the market given its incumbency within the region (45% of revenues in 2010 come from Europe) as well as strength in international markets. Moreover, its leading position in gas and water markets should enable reduced risk exposure to the slowdown in electric meter deployments in North America expected over the next year. We therefore initiate coverage on ELT with a 1-Overweight/2-Neutral rating.

From a margin perspective, we do not expect material expansion given the nature of the smart meter industry. By nature, gross margin expansion in the metering industry is fairly limited, and is highly dependent on product mix (electric vs. gas vs. water), and is primarily driven by cost reduction efforts, manufacturing improvements or ASP trends. We expect improved demand trends to help drive operating leverage for the company leading to our expectations for improved EPS growth as Elster benefits from expected international awards in 2H12 and beyond.

Figure 90: Elster (ELT) Investment Framework

Market Growth Opportunity	◔	- The smart grid is expected to be a steady upgrade cycle, with splashes of growth supported by government stimulus. Effectively, without a compelling cost-benefit analysis of regulatory requirement, utilities may not want to pay someone for something that will get customers to use less of their service. - Given the next wave of investment isn't expected until 2013 in Europe, we expect a modest growth environment for the next 12 months with a pick-up in the following 12 months.
Potential for Share Gains	◕	- Comparatively, we believe Elster is well positioned in key areas of the market, including gas and water in North America (enabling it to be less impacted by declining electric meter investments) and internationally where we expect the next wave of upgrades to take place, led by initiatives such as the EU's 20 / 20 directive.
Likelihood of Margin Expansion	◑	- In general, we don't expect much by way of margin expansion for the broader metering industry as pricing remains competitive and there is limited scope for vendors to squeeze additional dollars out of utilizities and municipalities. - Over time, we do expect increased software content to drive modest opportunities, however.
Barriers to Entry	●	- While not high in technology differentiation, Elster's customer relationships provide a high barrier to entry. - Utilities are simply risk averse and don't want to rely on a company that could ruin its customer relationships, or worse, spark the ire of regulatory authorities.
Capitalization	◑	- Though Elster's high net debt structure has served as an overhang for the shares, we believe the company has improved its capitalization in recent quarters. - Coupled with steady cash generation, Elster has ample liquidity to run its operations, in our view.
Risk Profile	◕	- Comparatively, we believe ELT remains better positioned to weather the downturn in spending by U.S. utilities as well as capture incremental opportunities through the next award cycle of smart meters internationally. - We recognize that the company's growth is predicated on additional awards, and thus could be subject to some potential lumpiness or risks associated with a more prolonged rollout cycle.
Valuation	◕	- Elster currently trades below its historical average since its public debut in late 2010. - Given our expectations for improving revenue growth, potential share gains, and operating margin leverage, we look for the gap between its current trading levels and its recent average of 13x to tighten as visibility on new awards improves.

Source: Barclays Capital

Background

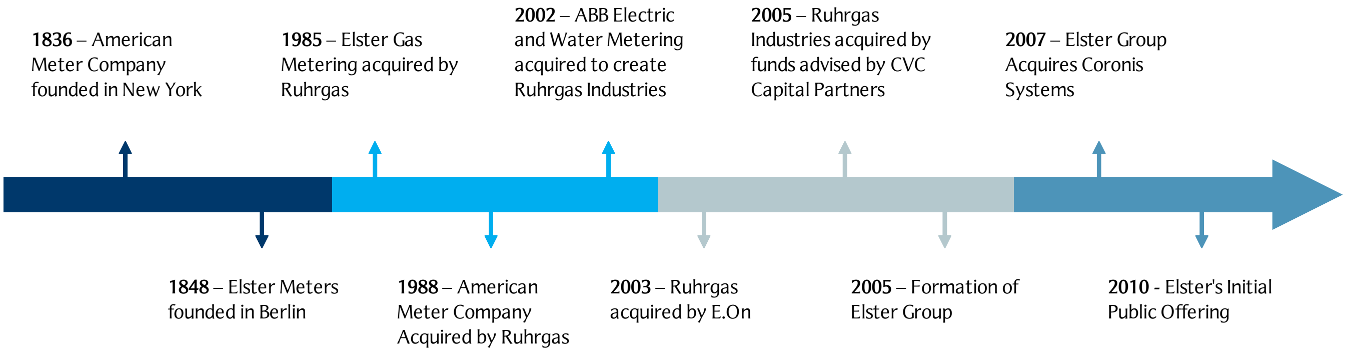
Tracing its heritage back to the early 1800s, Elster emerged in its current form through a series of acquisitions, private investments and ultimately going public in 2010.

Elster can trace its heritage back to New York's American Meter Company (AMCO), established in 1836, and Berlin's Elster Meter, established in 1848. In the 1980s, Ruhrgas, a global gas company responsible for gas procurement and production, acquired both AMCO and Elster Meter. Followed by several more acquisitions throughout the 1990s, Ruhrgas was acquired by the E.On group, a German utility group, in 2003, to create E.On Ruhrgas. In 2005, CVC Partners, a private equity firm in Europe and Asia, acquired E.On Ruhrgas for around €1.5 billion. CVC noted that the potential for market growth in advanced meter reading and Ruhrgas's position in the market made the company a good candidate for floatation on a stock exchange. Around the same time, the Elster Group was formed.

Already established as a major market player in multi-utility metering solutions, Elster planned to expand its AMI solutions market with its acquisition of Coronis Systems in 2007.

Coronis Systems designed ultra-low-power, long-range wireless communications solutions and platforms with its Wavenis technology. Similar to Itron's alliance with Cisco Systems, Elster's acquisition brought to fruition the long-term goal of interoperable and integrated system solutions. To broaden its exposure and capture market share, Elster acquired EnergyICT in 2009. EnergyICT provided smart metering and smart grid solutions in Europe, the United States, and Australia. The acquisition strengthened Elster's AMI and smart grid portfolio and reinforced both companies' philosophy of open standards and interoperability. Elster completed its initial public offering in 2010.

Figure 91: Elster Timeline


1836 – American Meter Company founded in New York
1985 – Elster Gas Metering acquired by Ruhrgas
2002 – ABB Electric and Water Metering acquired to create Ruhrgas Industries
2005 – Ruhrgas Industries acquired by funds advised by CVC Capital Partners
2007 – Elster Group Acquires Coronis Systems
1848 – Elster Meters founded in Berlin
1988 – American Meter Company Acquired by Ruhrgas
2003 – Ruhrgas acquired by E.On
2005 – Formation of Elster Group
2010 - Elster's Initial Public Offering

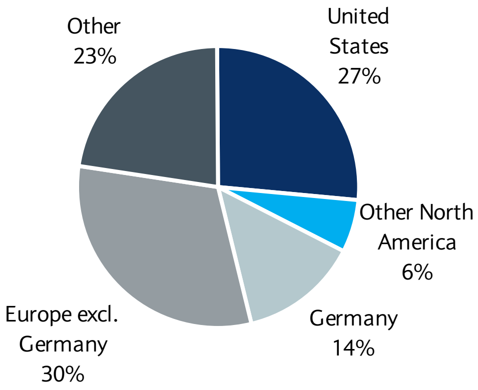
Source: Barclays Capital, Company Reports

Elster's Product Portfolio

In our view, Elster has one of the most comprehensive suites of products in the metering industry.

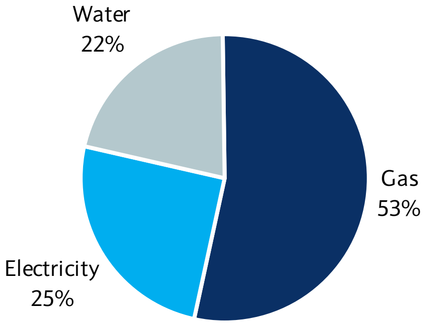
Elster's portfolio is equipped with hundreds of different products all for the purpose of energy conservation and data management. Each business line comes with products that are specially designed for North American or European standards. Some meters are also designed to meet international standards. The breadth of Elster's product offerings service upstream, midstream, and downstream markets allowing Elster to participate in growth from infrastructure build on the upstream side and residential growth driven by regulative initiatives and incentive structures. Currently, the upstream business accounts for a small percentage of North American gas revenues representing a significant potential growth opportunity down the line.

Figure 92: FY10 Revenues by Region



Source: Barclays Capital, Company Reports

Figure 93: FY10 Revenues by Segment



Source: Barclays Capital, Company Reports

Gas

With 170 years of gas production, Elster's gas business develops and manufactures advanced technology used to measure, regulate, and safely control gases and serves as Elster's largest and most profitable business. Elster's management believes the gas market is entering its golden era and that new natural gas infrastructure provides ample opportunity for high-value metering and stations. Elster's gas business offers gas metering and regulation technology specialized to each of its different geographical markets, gas utilization technologies, and gas distribution systems. Elster's gas metering and regulating products control gas pressure and record consumption data. Elster's distribution systems allow installers to make connections from the "main to meter" and "tank to house." Elster represents approximately 28% of the global gas market (ex. China) and 21% including China.

Water

Elster's water business provides advanced water metering products and intelligent water metering solutions. Elster develops automated meter reading (AMR)/AMI solutions, utility products from residential and commercial facilities, industrial products that can detect oil and chemical levels, and submetering products for multi-unit submetering. Elster represents approximately 12% of the global water market (ex. China) and 7% including China.

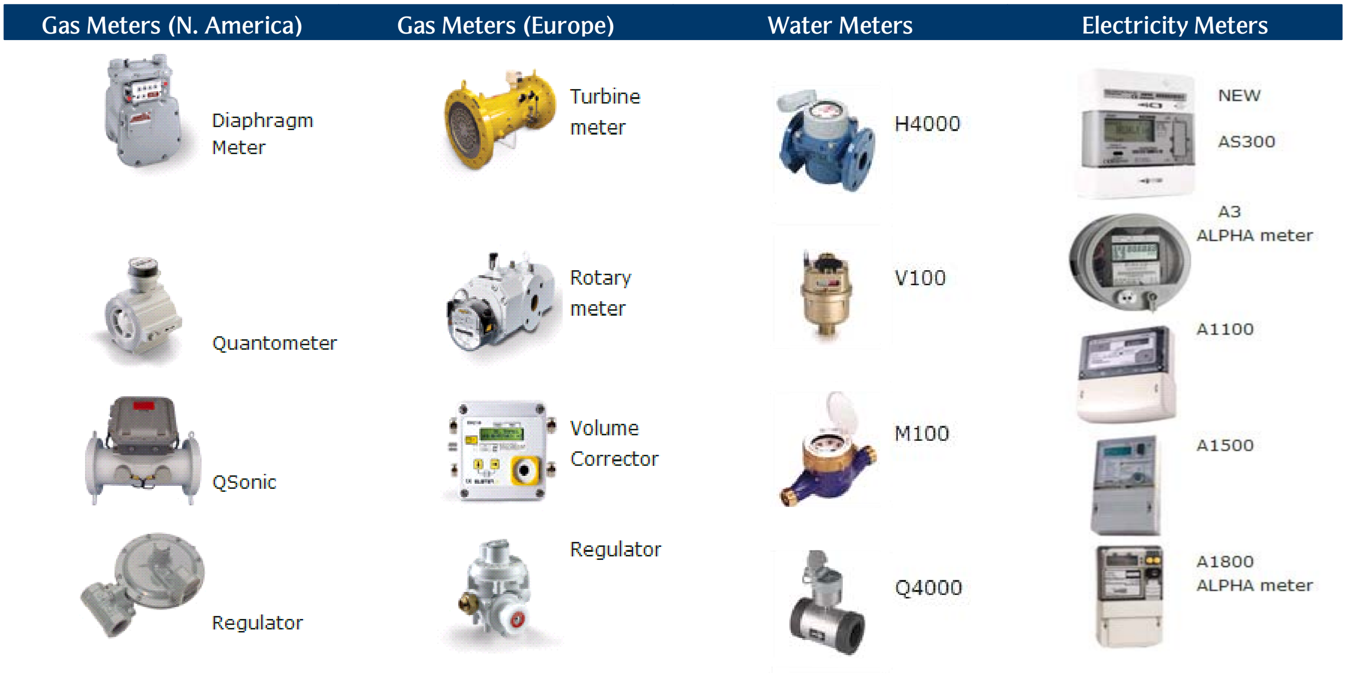
Electricity

Elster's electricity business offers technologies that employ advanced metering infrastructure for the purpose of energy conservation and better resource management. Elster's electricity meters are used for residential, commercial, and industrial applications and support both AMR and AMI systems. Elster represents approximately 4% of the global electricity market (ex. China) and 2% including China.

Smart Grid Solutions

Elster's smart grid solutions are designed to help customer deploy smart metering systems, demand response technologies and smart grid management solutions. Elster offers various systems and solutions for gas, electric, and water meters. Some of its solutions include EnergyAxis, EnergyICT, Evolution, TRACE, and Coronis.

Figure 94: Elster's Product Portfolio



Source: Company Website

We view the meter market as fairly mature with relatively limited material shifts in the competitive dynamics of the industry. However, the advent of smart grid technology has the potential to disrupt the competitive landscape as relative upstarts (e.g., Silver Spring Networks) look to disrupt the incumbent competitive landscape (e.g., Elster, Itron, and Landis+Gyr)

Management Team

The background of Elster's management team is largely a mix of utilities and networking experience. Pieces of Elster's management have been carried over through the M&A activity affecting the firm in recent years while some members have joined since leaving executive positions at other utilities and networking companies.

- **Simon Beresford-Wylie:** Mr. Beresford-Wylie joined Elster in 2009 as the CEO. Prior to his post at Elster, he was the CEO of Nokia-Siemens Networks and a member of its executive board. Mr. Beresford-Wylie joined the Nokia Group in 1998 and held various senior positions before taking over as CEO in 2007. Mr. Beresford-Wylie is also a non-executive director at Vitec Group.

- **Christoph Schmidt-Wolf**: Mr Schmidt-Wolf has been the CFO at Elster since 2005 and served as the CFO of Tenovis prior to that. He also served as the VP of Finance for Avaya and CFO of Stepstone ASA before that. Mr Schmidt-Wolf began his career working at Hewlett-Packard followed by Compaq.

- **Thomas Preute**: Mr. Preute became the Chief Legal Officer and Managing Director for Elster in 2010. He has served as Elster's Chief Compliance Officer since 2007 and

General Counsel and Vice President since 2003, as an employee of Ruhrgas Industries. Prior to his tenure with Elster, he worked as head of corporate law at W.ON Ruhrgas in its private legal practice.

- **Michael Calovini**: Mr. Calovini serves as the Executive Vice President of Gas International alongside Mr. Ralf Geiger.
- **Ralf Geiger**: Mr. Geiger serves as the Executive Vice President of Gas International alongside Mr. Michael Calovini.
- **Frank Hyldmar**: Mr. Hyldmar serves as the Executive Vice President of Electricity International. Prior to joining Elster, he served as the Chief Sales and Marketing Officer at DHL. Mr. Hyldmar also spent part of his career at Velux and Maersk.
- **Jerry Lauzze**: Mr. Lauzze serves as the Executive Vice President of Water at Elster. Before that, he worked at Dresser and Halliburton.

ELT – Investment Outlook

Capital Structure

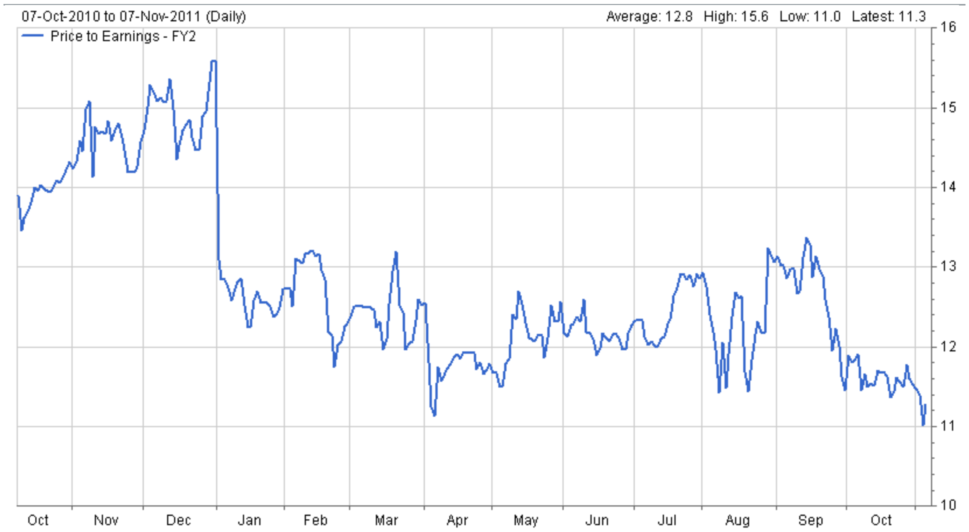
Elster currently has a net debt position of roughly $540 million. Any operational issues could be further exacerbated given its debt position. Elster has a debt-to-equity ratio of .93x. Moreover, with a limited float of 14%, we can expect volatility in the company's stock price given potential economic and company-specific uncertainties. The private equity firm that purchased Elster in 2005, CVC Capital Partners, still owns 61% of the company.

Estimates and Valuation

Our 2012 estimates reflect our expectations for continued growth in Elster's international business in part offsetting tepid demand in North America for the near term. Looking at 2H12 and into 2013, we expect the company to begin to benefit from the expected multi-year rollout of smart meters in Europe, driving accelerating top-line growth. While material margin expansion is unlikely, we anticipate leverage on the company's operating line. Our 2012 and 2013 sales and EPS estimates are $1,923mn/$1.22 and $2,024mn/$1.41, respectively.

Our $18 price target is based on 13x our CY13 EPS estimate of $1.41, in line with the company's historical average multiple since its late 2010 IPO.

Figure 95: Elster's Historical FY2 P/E Trading Range Since its 2010 IPO



Source: FactSet

Elster is currently trading below its peers on an average and median basis, largely we believe because of overhangs associated with the company's capital structure.

Figure 96: SmartGrids: Comparable Companies Analysis

($ in millions except per share data)												Calendar Year Trading Multiples						
		Price as of	Market	Firm	Calendar Year Sales			Calendar Year EPS			Price to Sales			EV / Sales			PE	
Company	Ticker	11/7/11	Capitalization	Value	2011E	2012E	2013E	2011E	2012E	2013E	2011E	2012E	2013E	2011E	2012E	2013E	2011E	2012E	2013E
ENERGY STORAGE																			
Badger Meter	BMI	32.91	497.6	494.5	264.4	273.8	280.1	1.48	1.59	1.64	1.9	1.8	1.8	1.9	1.8	1.8	22.2	20.7	20.1
Echelon	Elon	5.83	247.4	225.6	155.1	178.0	200.9	(0.38)	(0.20)	0.05	1.6	1.4	1.1	1.5	1.3	1.1	NM	NM	NM
EnerNOC	ENOC	9.80	250.3	96.9	288.6	291.2	423.2	(0.34)	(0.84)	0.79	0.9	0.9	0.2	0.3	0.3	0.2	NM	NM	12.4
ESCO Technologies	ESE	30.74	818.3	925.9	692.6	732.8	826.5	1.96	2.25	2.54	1.2	1.1	1.1	1.3	1.3	1.1	15.7	13.7	12.1
Itron	ITRI	37.95	1,556.0	1,922.7	2,350.7	2,245.4	2,337.6	4.07	3.93	4.10	0.7	0.7	0.8	0.8	0.9	0.8	9.3	9.6	9.3
										MEAN	1.2	1.2	1.0	1.2	1.1	1.0	15.7	14.7	13.5
										MEDIAN	1.2	1.1	1.1	1.3	1.3	1.1	15.7	13.7	12.3
										HIGH	1.9	1.8	1.8	1.9	1.8	1.8	22.2	20.7	20.1
										LOW	0.7	0.7	0.2	0.3	0.3	0.2	9.3	9.6	9.3
Elster	**ELT**	**14.20**	**1,602.9**	**2,143.2**	**1,876.1**	**1,922.6**	**2,023.9**	**1.10**	**1.22**	**1.41**	**0.9**	**0.8**	**1.1**	**1.1**	**1.1**	**1.1**	**12.9**	**11.6**	**10.0**

Source: Company reports, FactSet, Barclays Capital estimates. Estimates for non-covered companies are from FactSet.

Over the next 12 months, we look for multiple expansion closer to the company's average comparables from current trading levels of approximately 10x our CY13 EPS estimates as visibility on international smart-meter awards improves through the course of next year.

ITRON INC. (ITRI; 2-EQUAL WEIGHT/2-NEU); PRICE TARGET $41

ITRI

Stock Rating
2-EQUAL WEIGHT

Sector View
2-NEUTRAL

Price Target
USD 41.00

Price (08-Nov-2011)
USD 38.17

Potential Upside/Downside
+7%

Itron Inc.(ITRI): Quarterly and Annual EPS (USD)

	2010	2011			2012			Change y/y	
FY Dec	Actual	Old	New	Cons	Old	New	Cons	2011	2012
Q1	0.98A	N/A	0.99A	0.99A	N/A	0.94E	0.87E	1%	-5%
Q2	0.94A	N/A	1.20A	1.20A	N/A	0.96E	0.98E	28%	-20%
Q3	1.03A	N/A	0.92A	0.92A	N/A	1.03E	1.00E	-11%	12%
Q4	0.95A	N/A	0.97E	1.00E	N/A	0.99E	0.95E	2%	2%
Year	3.89A	N/A	4.07E	4.11E	N/A	3.93E	3.85E	5%	-3%
P/E	9.8		9.4			9.7			

Source: Barclays Capital
Consensus numbers are from Thomson Reuters

COMPANY SNAPSHOT

Itron U.S. Clean Technology and Renewables

Income statement ($mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	2,259	2,351	2,245	2,338	1.1%
EBITDA	306	305	292	321	1.6%
EBIT	253	253	235	251	-0.3%
Pre-tax income	205	218	232	249	6.6%
Net income	159	167	162	171	2.5%
Reported EPS ($)	3.89	4.07	3.93	4.10	1.8%
Diluted shares (m)	41	41	41	42	0.7%
Dividend per share ($)	NA	NA	NA	NA	NA

Margin and return data (%)					Average
EBITDA margin	13.6	13.0	13.0	13.7	13.3
EBIT margin	11.2	10.8	10.5	10.7	10.8
Pre-tax margin	9.1	9.3	10.3	10.6	9.8
Net margin	7.1	7.1	7.2	7.3	7.2
ROIC	12.7	14.7	12.6	13.7	13.4
ROA	5.8	7.5	7.1	7.1	6.9
ROE	11.2	16.0	14.1	13.5	13.7

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	299	291	289	277	-2.5%
Intangible fixed assets	1,501	963	912	871	-16.6%
Cash and equivalents	169	216	320	462	39.7%
Total assets	2,746	2,220	2,300	2,411	-4.2%
Short and long-term debt	611	492	477	457	-9.2%
Other long-term liabilities	707	680	674	688	-0.9%
Total liabilities	1,318	1,173	1,152	1,145	-4.6%
Net debt/(funds)	441	277	157	(5)	NA
Shareholders' equity	1,428	1,048	1,148	1,266	-3.9%
Change in working capital	(152)	192	33	10	NA
Operating cash flow	255	261	187	233	-3.0%
Capital expenditure	63	63	67	70	3.7%
Free cash flow	505	164	316	356	-11.0%

Valuation and leverage metrics					Average
P/E (x)	9.8	9.4	9.7	9.3	9.6
EV/EBITDA (x)	6.5	6.0	6.0	5.0	5.9
FCF yield (%)	32%	10%	20%	22%	21.3
Price/sales (x)	0.7	0.7	0.7	0.7	0.7
Price/BV (x)	1.1	1.5	1.4	1.3	1.3
Dividend yield (%)	NA	NA	NA	NA	-
Total debt/capital (%)	30%	32%	29%	27%	29.4

Selected operating metrics ($mn)					CAGR
North America Revenue	1177.4	1104.3	922.9	881.3	-9.2%
YoY Growth	91.2%	-6.2%	-16.4%	-4.5%	NA
International Revenue	1081.9	1246.4	1322.5	1456.3	10.4%
YoY Growth	1.0%	15.2%	6.1%	10.1%	NA
Electric Meter Market	4762	4525	4639	5131	2.5%
Gas Meter Market	1411	1499	1582	1759	7.6%
Water Meter Market	2124	2250	2398	2552	6.3%
Total Market Growth	8297	8274	8619	9442	4.4%

Source: Company Data, Barclays Capital

Stock Rating	2-EQUAL WEIGHT
Sector View	2-NEUTRAL
Price (08-Nov-2011)	$ 38.17
Price Target	$ 41.00
Ticker	ITRI

Investment case

Our 2-Equal Weight rating is predicated on limited visibility on ITRI's ability to offset expected declines in its North American sales. Our $41 price target equates to 10x our CY13 EPS estimate of $4.10.

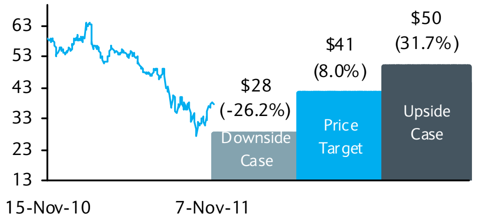
Upside case **$50.00**

ITRI's ability to stabilize sales in 2012 and capture incremental share in 2013 could support a more healthy growth cycle. Coupled with its buyback and cost reduction initiatives could lead to EPS north of $4.40. Assuming this multiple expansion (~12x) yields an upside case of $50.

Downside case **$28.00**

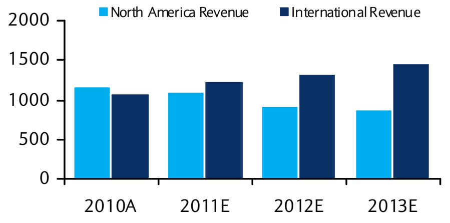
ITRI's inability to offset declining NA sales and a prolonged EUR award process could yield revenue declines through 2013. While buyback/cost reductions can soften impact to bottom line, we estimate downside earnings of $3.50. Multiple compression (8x) yields a downside case of $28.

Upside/downside scenarios



Source: FactSet

Revenues by Geography



Note: FY end Dec.

ITRON INC. (ITRI) – INITIATING COVERAGE AT 2-EW

We initiate coverage of Itron (ITRI) with a 2-Equal Weight rating and $41 price target.

We initiate coverage of Itron Inc. (ITRI) with a 2-Equal Weight/2-Neutral rating and $41 price target. Overall, we consider Itron a company in transition; an improving balance sheet and the return of its veteran CEO puts the company on surer footing for the next phase in evolution for the smart meter market. However, because we have limited visibility on the company's ability to offset declining U.S. revenues in the near term (since international awards are unlikely to pick up before 2H12), we prefer to remain on the sidelines for now.

For 2012, our estimates factor in continued international growth offset by expected declines in North America. For 2013, we expect stabilization in Itron's home market with an uptick in international demand led by expected awards in Europe. Our 2012 and 2013 sales and EPS estimates are $2,245 mn/$3.93 and $2,338 mn/4.10 respectively. Our $41 price target equates to 10x our CY13 EPS estimate of $4.10.

Itron – Company Description

Itron is a global provider of end-to-end smart metering solutions to electric, natural gas and water utilities.

Incorporated in 1977 and headquartered in Liberty Lake, Washington, Itron is a global provider of end-to-end smart metering solutions to electric, natural gas, and water utilities. The company serves over 8,000 customers across a global foot print of 130-plus countries.

Itron offers electricity, natural gas, and water metering systems, software, and related services. The company classifies its metering system into three broad categories: standard metering, advanced metering systems, and smart metering systems. Historically, the company built its business around traditional meters, which were primarily read manually. In recent years however, automated meter reading (AMR) and advanced metering infrastructure (AMI) technologies have emerged. These technologies are designed to promote “smart meters” which improve and enhance accurate data collection from the field.

As mentioned earlier in our report, a smart meter detects electricity, gas, or water consumption by a home or business and communicates it back to the utility for monitoring and billing purposes. Smart meters also provide information on when the energy is consumed. This technology serves utilities as they can reduce costs by matching generation and consumption. Utilities can also use the data gathered to price energy based on time and season.

In our view, utilities don’t want to take on the necessary risk of deploying a meter and then needing to: 1) service it on a consistent basis (incurring costs), or 2) potentially having a failure point that would impact their reputation with both customers and regulators. Moreover, risk-averse utilities are concerned about relying on just one company to deploy meters but find it difficult to do otherwise as each company has different meters and technology. In order to work toward mitigating this concern, the Device Language Message Specification User Association (DLMS UA), the widely accepted international standardization body responsible for establishing standards for electricity meter data exchange, hand-selected some of the largest metering companies like Itron and competitors Landis+Gyr and Iskraemeco to develop interoperable smart meters supporting utility applications. The purpose of these meters is to allow customers to mix and match products from different suppliers and help drive broader adoption of the technology through the standardized interfaces.

ITRI – Investment Positives

Full Suite of Products

Itron has a comprehensive suite of products across all major categories to address broad utility needs (electric, gas, water) and thus remains well positioned to capitalize on specific end market upgrade needs. Moreover, the company has historically strong relationships with utilities both in the United States and abroad, a key barrier to entry among a specific customer base that does not like to take on unnecessary technology risk. We believe the company's strategic partnership with Cisco is a long-term opportunity potentially enabling the company to drive ongoing innovation through a more comprehensive suite of advanced solutions.

Focusing on Profitability: The Right Step

Recently, management announced that it plans to streamline operations through the examination of its global purchasing activities as well as looking to consolidate its global manufacturing footprint. The company is currently in the midst of a restructuring plan that is expected to save the company approximately $30 million by 2013, approximately $15 million of which will flow through in 2012. Within the plan, Itron is closing six manufacturing facilities and implementing changes to 25 others while reducing 7.5% (750) of its employees. While execution risk remains, we were encouraged by the recent announcement as a necessary first step in streamlining its operations, particularly against a backdrop of tempered near-term purchasing.

Management Shift Should Open the Door to a New Strategy

Itron recently brought back Leroy Nosbaum to the post of President and CEO this past summer. Itron has struggled in communicating its near- to mid-term strategy and long-term growth opportunity as investor concerns have focused on potential earnings deterioration in 2012 and limited specifics on how the company plans to hit its recently stated goal (at its spring analyst day) of doubling size by 2015. With over 10 years of experience at Itron, Mr. Nosbaum's return brings the potential for improved clarity on the company's strategy. As a first step, the company's recent 3Q earnings proved promising. Mr. Nosbaum, in our view, was quite frank in his assessment of the company's prospects and implemented a number of initiatives to help improve visibility into Itron's operations. These include the previously mentioned restructuring efforts, focus on near-term execution, a $100 million stock buyback and a strong emphasis on a balanced (product and geography) portfolio.

ITRI – Investment Risks

Visibility on Backfiling Near-Term Revenue Gap Limited

Four of Itron's major U.S. AMI deployments are expected to be largely completed by the end of 2012, leading to potential material revenue and earnings declines. The first major AMI rollouts in Europe are not expected till at least 2013, and thus the question on how Itron will fill that gap between now and then is likely to remain an overhang on the shares. Management's recent update for 2012 guidance (sales flat to down 5% which assumes a $300 million revenue shortfall) seems to have alleviated the most draconian of concerns of a fall-off in revenues. Nonetheless, the company still needs to execute in order to capitalize on international opportunities which are expected to at least in part offset the shortfall.

High Execution Risk

The combination of projected near-term revenue declines, the need to drive business for new markets, pending restructuring efforts, and a new captain leading the ship, all point to high execution risks for Itron. Management has guided to flat to down 5% revenues in 2012. With 12-month bookings down 6% y/y and total backlog down 18% y/y, this suggests healthy expectations of book and ship business in order to meet its goals. We recognize that the company's backlog is primarily related to its North America business, and thus management's 2012 outlook already factors in declines in backlog. However, on a net basis, we believe the company's growth prospects are increasingly dependent on international markets, which are increasingly higher book-ship in composition. Therefore, on balance, Itron faces higher execution risk in order to meet its longer term goals of returning to top-line growth.

Product Quality Concerns May Influence Contract Wins

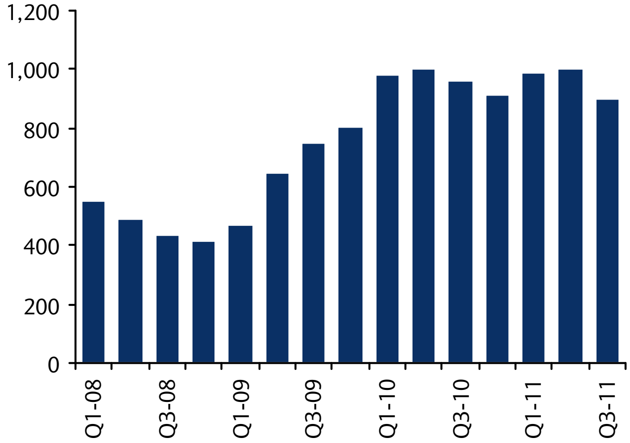
Most recently highlighted in the 3Q11 earnings call, Itron experienced a warranty expense of $25 million, as compared to historical levels of $4-5 million, driven primarily by issues involving water diodes in its meters. This charge accounted for a 3% reduction in the quarter's gross margin and $0.33 per share. Management indicated that the issue was largely component related and that it is a key priority to ensure the issue does not repeat. However, if this type of issue were to persist, product control concerns could emerge, impacting the company's ability to win some contracts at risk-averse utilities.

Our View

We consider Itron a company in transition. Opportunities in the company's historically strongest market (North America) are maturing while the expected material pick-up in the next wave of smart metering installations (Europe) is still 12 months or more away. We recognize that the opportunity in Europe would be material with 145 million meters needing upgrades by 2020. This suggests a potential market opportunity of $7-15 million (assuming ASP of $50-100 per device) over a given period. However, the challenge is that: 1) Itron's near-term revenue outlook over the next 12-15 months already requires incremental revenue growth in international markets as well as additional wins in the United States, and 2) inherently the company's business will depend more on book-ship assumptions thus decreasing the company's visibility and increasing its risk profile.

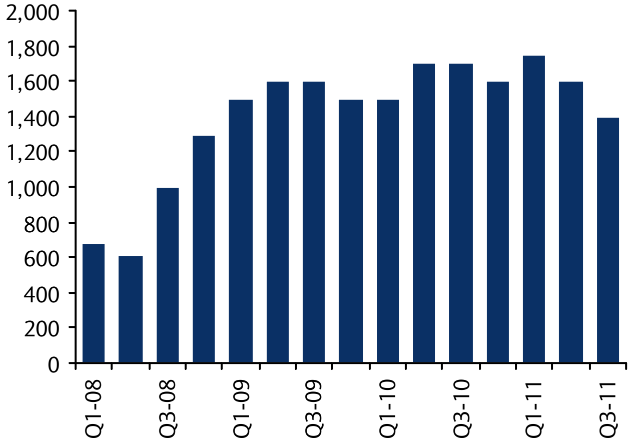
We are less concerned, however, about the company's backlog performance in recent quarters (Itron's 12-month backlog was down 6% in its September quarter, the first decline since 1Q09). Itron's backlog generally represents its North American business, and therefore its sales outlook for 2012 already factors in recent backlog trends, in our view.

Figure 97: Itron's 12-Month Backlog ($ million)



Source: Company Reports

Figure 98: Itron's Total Backlog ($ million)



Source: Company Reports

In recent months, the company has made significant steps in stabilizing its standing in order to bridge the gap, including improving its capital position (retiring its converts and lowering its interest expense outlook) and putting industry and Itron veteran Leroy Nosbaum in place as CEO. Moreover, a restructuring plan is in play to help optimize profitability, and while there is execution risk, we believe management's efforts should yield improving margins in the coming quarters, despite weak, if any, sales growth. These measures have certainly stabilized the company in recent months and have enabled better visibility for investors in order to assess its prospects.

Despite Itron's improved stability and an energized new CEO, we prefer to wait on the sidelines until visibility on Itron's ability to garner more than its fair share of international business improves. The following table highlights our investment case.

Figure 99: Itron (ITRI) Investment Framework

Market Growth Opportunity	◔	- The smart grid is expected to be a steady growth opportunity, with splashes of growth supported by government stimulus. Effectively, without a compelling cost-benefit analysis of regulatory requirement, utilities may not want to pay someone for something that will get customers to use less of their service. - Given the next wave of investment isn't expected until 2013 in Europe, we expect a modest growth environment for the next 12 months with a pick-up in the following 12 months.
Potential for Share Gains	◑	- Itron is well positioned globally, with a stronger position in the US vs. International. - We believe utilities highly favor incumbents due to high replacement of meters putting Itron in a favorable position considering its customer relationships. - Incremental share gains, however, may be difficult.
Likelihood of Margin Expansion	◑	- We believe the company's recent restructuring announcement positions Itron for an improved cost structure. - However, meters are not necessarily a margin-expansive business, particularly in the electricity markets (Itron's largest current market) where price competitiveness is fairly high. - We thus don't expect gross margin to expand beyond its high-20s to low-30s range.
Barriers to Entry	●	- While not high in technology differentiation, Itron's customer relationships provide a high barrier to entry. - Utilities are simply risk averse and don't want to rely on a company that could ruin its customer relationships, or worse, spark the ire of regulatory authorities.
Capitalization	◑	- Itron has made significant improvements in its capital structure by reducing its debt. - Its cost-reduction plans should improve its cash-generation capabilities as well.
Risk Profile	◑	- We believe the company continues to face risk around weakening demand trends in its core North American markets - The long-term will depend on crisp execution -- largely under a new CEO -- to drive incremental strength in markets it hasn't historically had as strong a position in.
Valuation	◑	- ITRI currently trades at 9x our CY13 EPS estimate of $4.10, below its recent recessionary lows of roughly 10x and at a discount to its peer, ELT. - We believe material multiple expansion is unlikely until visibility on management's ability to offset expected revenue declines improves.

Source: Barclays Capital

Based on our investment framework, we initiate coverage on Itron (ITRI) with a 2-Equal Weight/2-Neutral rating. Our $41 price target equates to 10x our CY13 EPS estimate of $4.10.

Background

Itron is a leading supplier of metering solutions for the global utilities.

Founded in Hauser Lake, Idaho in 1977 by a team of engineers seeking a more efficient way to read meters, Itron has come a long way as a supplier to the global utilities market. Itron provides technology to facilitate responsible management and delivery of energy and water resources primarily for utilities. Upon inception to date, Itron has developed a strong market share in automatic meter reading (AMR) in North America delivering over 85 million communicating devices. Through acquisitions, Itron has expanded into related markets providing end-to-end solutions for customers. Solutions include meters, communications networks, meter reading systems, and meter data management. With its large portfolio and diverse customer base, Itron highlighted at its recent analyst day that it expects to double the size of its company by 2015.

Itron's growth over the last several years has largely been driven by its strong presence in the growing North American market. However, Itron's recent commentary during is 3Q earnings is in line with our internal checks regarding maturation of initial large-scale contracts in North America. Management commented that North America will contribute less to its overall revenue numbers than it has in the past for upcoming quarters. One of the reasons Itron fared well in the North American market is because it was the beneficiary of stimulus awards. However, with the bulk of the awards already handed out and several large contracts near completion for 2012, Itron energy revenue growth will be stunted. We expect the awards cycle in Europe to pick up at the back end of 2012 and early 2013 and question whether Itron can bridge the gap for 2012.

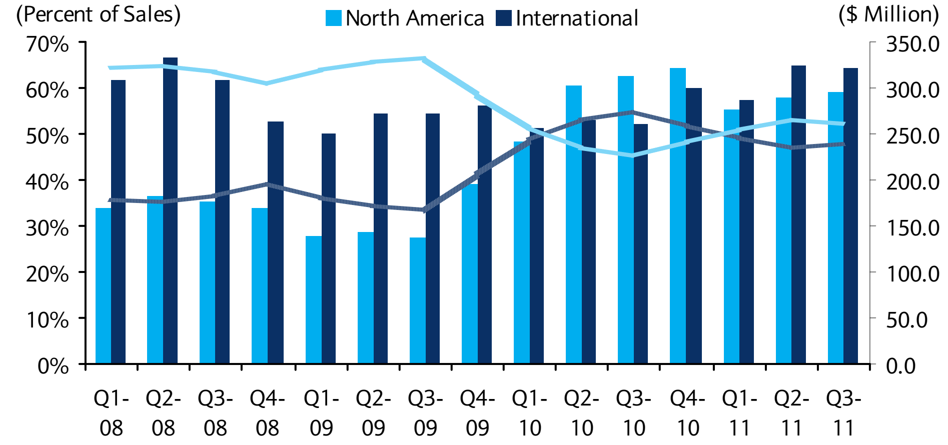
To appease this concern, Itron developed a plan to double the size of its company by 2015. Itron expects around 65% organic growth and 35% inorganic growth via strategic acquisitions to meet its target. Given its net debt position at approximately $366 million, we were concerned as to how Itron will reach its 2015 growth objectives, especially considering a slowdown in top-line growth for 2012. Based on our takeaways from the company's September earnings call, while these targets are not off the table, we believe management, especially newly minted CEO Leroy Nosbaum, is prioritizing near term execution.

Itron's Product Portfolio

Historically, Itron has been relatively better positioned in North America vs. other areas of the world.

Itron breaks its revenue stream down into Itron North America and Itron International. Within each segment, the company also highlights its revenues from specific utility types such as electricity, gas, and water. Itron has improved its North American presence over the last few years while keeping its International sales consistently strong. Based on the company's own estimates, Itron North America currently represents close to 50% of sales for the company versus 35% in 2008. Itron's market share consists of 17% of the international market (excluding China) and 45% of the North American market.

Figure 100: Itron's Revenues by Segment



Source: Company Reports

The company offers a comprehensive suite of products for electricity, gas, and water markets globally.

Itron hosts a comprehensive suite of products to serve its global client base from components and meters to entire systems solutions. The company offers primarily three types of electric, gas, and water metering systems for utilities and associated grid solutions to meet specific customer needs.

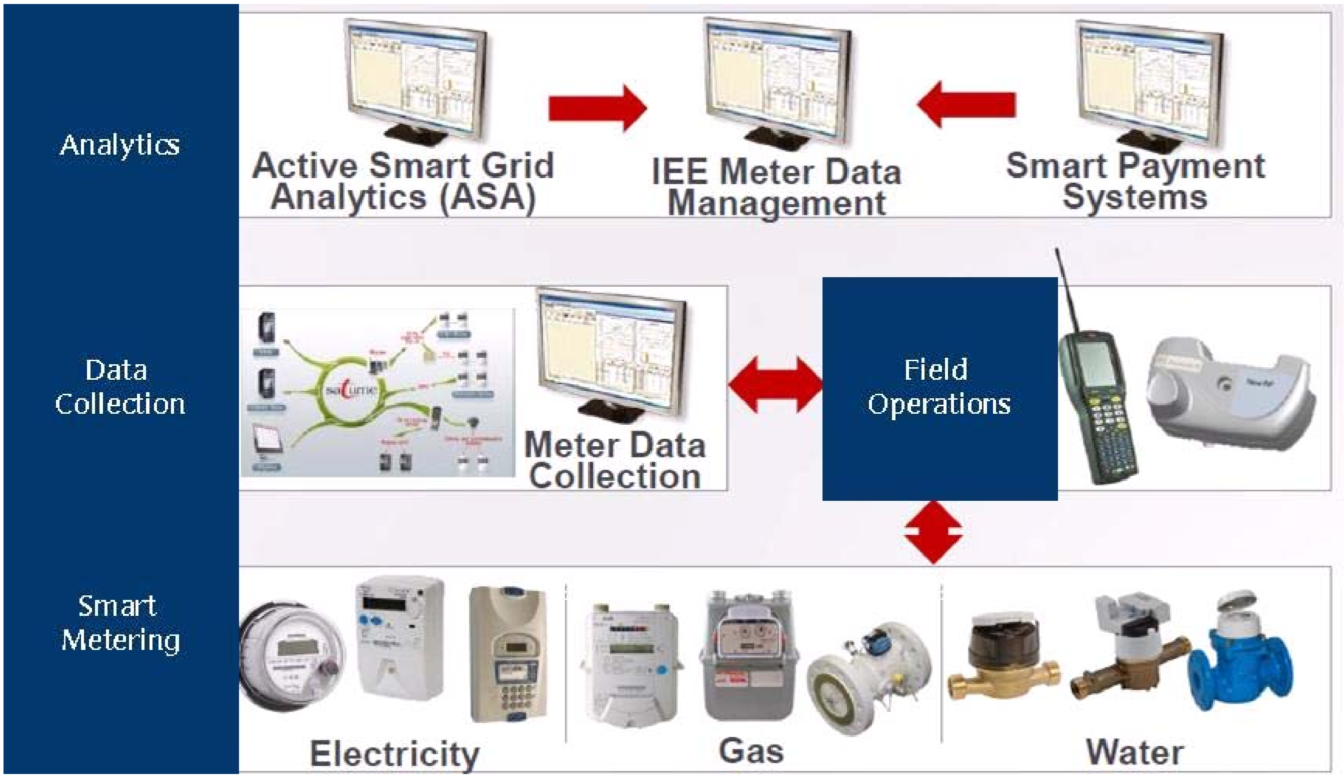
- **Standard Metering:** A standard meter measures electricity, natural gas, or water usage without a built-in remote-reading communication capability. These meters require manual reading typically performed by representatives from utilities or meter reading services. Itron produces standard meters for residential, commercial and industrial, and transmission and distribution end users.

- **Advanced Metering Systems and Technology:** Advanced metering differs from standard metering in that it uses a communication module that collects and stores detailed meter data. Information collected is then transmitted to handheld computers, mobile units and fixed networks allowing utilities to analyze the data for billing and efficiency purposes. Depending on the country, communication technologies include the telephone, RF (radio frequency), GSM (global system for mobile communication), PLC (power line carrier), and Ethernet devices.

- **Smart Metering System and Technology:** Smart meters represent the "next big thing" in metering technology. Smart meters initiate and respond to two-way communications with utilities and will frequently collect and transmit meter data. Smart meters have more functionality than advanced meters as they can also provide two-way communications with other in-house devices like appliances, thermostats, home area networks, and advanced control systems. OpenWay is Itron's smart grid solution. OpenWay improved its communication infrastructure with its partnership with Cisco.

The company's solutions primarily include the meters and controls used to accurately measure resource use (electric, gas and water) but also tools/software used for data collection as well as consulting services to merge demand response and efficiency of the system.

Figure 101: Itron's Product Portfolio



Source: Itron

Acquisitions and Alliances:

Itron has relied on acquisitions as a key means to expand its product portfolio and geographic footprint.

A legacy theme in the clean technology and renewables space is growth by way of mergers and acquisitions. This makes sense as companies with manufacturing capabilities will seek companies with proprietary technology and vice versa. Itron, like most players in the industry, grew its business organically, but also made some strategic acquisitions and alliances in recent years to grow. In fact, as previously mentioned, Itron will further this trends as it expects roughly 65% organic growth and 35% inorganic growth via strategic acquisitions to meet its 2015 target of doubling its revenues.

Schlumberger Electricity Metering

In order to expand its metering portfolio, Itron acquired the electricity meter business from Schlumberger Limited, an established oil-field services company, in 2004. Itron paid $255 million for the business. This acquisition was strategic at the time as the electricity metering industry was creating demand for electronic meters to replace the existing electromechanical meters.

Actaris Metering Systems: The push toward global expansion

Prior to acquiring Actaris in April 2007, Itron was one of the leading suppliers of electric meters and AMR systems to utilities in North America with a narrow presence internationally. Actaris on the other hand supplied electric, gas, and water meters around the world with very little to no exposure in North America. The deal has proved to be fruitful strategically as Itron is currently the number one supplier of meters in North America and the world. Itron paid approximately $1.6 billion/€1.25 billion for Actaris. This is composed of €800 million plus the retirement of approximately €445 million in debt for a total of €1.25

billion. The acquisition was funded with approximately $325 million of cash on hand; $225 million of net proceeds from a private placement of equity; and about $1.1 billion of senior secured debt.

Cisco Systems: The shift to standardized communications networks

In efforts to meet the highly demanded standardization across the industry, Cisco and Itron announced a strategic alliance in September 2010. Bringing Cisco's Internet Protocol (IP) communications network to a smart grid system is designed to create a secure, open, and IP-based platform for interoperable communication. In our view, the gradual shift to IP is a beneficial development for smart grids, helping to drive further standardization and ultimately improved adoption. Itron will license and embed Cisco's IP technology within its meters, and distribute Cisco's equipment with smart meter deployments. Many risk-averse utilities are trying to avoid leaving all their proverbial eggs in one basket by using meters from just one supplier. Developing standards to reach smart grid inoperability is an important step toward meeting foreseen market needs for a standards-based approach in networking infrastructure.

The Three Ps: Pilots, Projects, and Pipelines

Itron remains poised to garner its share of emerging European opportunities, though we recognize execution is critical.

To date, Itron has a 45% share of the total North American AMR/AMI demand giving it 87 million cumulative (gas, electric and water) endpoints. Within that figure, Itron hosts 71% of the North American gas demand with 36 million meter endpoints thus far. According to management, the opportunity in North America, which is still growing, has transitioned past the pilot phase. Pilots at this point aren't intended to demonstrate the effectiveness of the technology considering Itron has over 6 million smart meters currently deployed in North America. Rather, the pilots demonstrate the economic viability behind a plan. Management indicated that we should expect these types of pilots to develop over time and larger comprehensive deals in the North American pipeline. They also mentioned that the 45 million AMR end points active today are going to start transitioning over to the smart grid. Itron noted that North American awards have been handed out for the most part and that several of their large contracts are nearing completion.

The opportunity in Europe for the adoption and deployment of smart meters has been growing in recent years despite utilities' opposition to massive projects. Some of the targets within the EU 2020 Directive are in the process of being converted into national law which is driving opportunities for large projects in Europe. The opportunity in Europe is largely composed of a shift away from traditional metering toward one-way metering. Italy, Malta, and Sweden have been the most aggressive in Europe with respect to a country-wide, large-scale smart grid. However, we expect the EU Directive to be a longer term driver for implementation, prompting France, Denmark, Spain, Ireland, Greece, and the UK to increase adoption.

Currently, Itron has three major projects in its European pipeline:

- Italgas: The Italgas project, to replace all gas meters in Italy, commenced earlier this year. Italgas is the largest provider of gas in Italy and is working with Itron to replace large commercial and industrial (C&I) meters. Beginning in early 2012, Itron will be working on small C&I meters and then a full residential roll-out.
- Iberdrola: Spain has a specific timeline for when it would like to replace all of its electric meters. Itron is participating in Iberdrola's pilot and also providing a software system. This alliance with Iberdrola has helped develop projects outside of Europe as well

considering Iberdrola's substantial international properties. The Iberdrola project is expected to be materially under way late 2012.

- ERDF: A lot of discussion has circulated around this topic as it's an initiative to replace 35 million meters for France's ERDF, the distribution subsidiary of Electricite de France (EDF). This project is shared between a consortium of suppliers. The pilot has been completed successfully and a full fledged roll-out is set to start late 2012 or early 2013. Given $145 million meters set to upgrade in Europe, ERDF seems to be one of the larger upgrade opportunities.

Management Team

We consider Mr. Nosbaum's return to the CEO position as a positive given Itron's need to capitalize on opportunities outside of its traditionally strongest region.

Members of Itron's executive team are once again led by Mr. LeRoy Nosbaum who grew revenues ten-fold from $193 million to $1.9 billion during his first term as Chairman and CEO. Mr. Nosbaum served as CEO from 2000-08 and turned Itron into one of the leading metering solutions company that it is today. Mr. Malcolm Unsworth succeeded Mr. Nosbaum in March 2009 and retired in August 2011. Mr. Unsworth joined Itron in July 2004 following Itron's acquisition of Schlumberger and served as President and COO of the company. In our view, Itron's move to bring back its old CEO, Mr. Nosbaum, brings back a well respected CEO of the company, but Itron's ability to deliver growth for at least the near term is still somewhat in question despite initial attempts to improve visibility on the company's prospects.

- **Leroy Nosbaum:** Mr. Nosbaum joined Itron in 1996 with various executive responsibilities. He went on to become CEO in 2000 and was elected chairman of the board in 2002. Mr. Nosbaum retired from his post in March 2009, only to return as President and CEO in August 2011. Before coming to Itron, Mr. Nosbaum was with Metricom, a supplier of wireless data communications networking technology. Prior to his post at Metricom, Mr. Nosbaum held various management positions with Schlumberger.

- **Philip Mezey:** Mr. Mezey has served as the President and Chief Operating Officer of Itron's global energy segment since March 2011. He is responsible for the global operations of Itron's electricity and gas businesses. Mr. Mezey also served as the SVP and COO for Itron North America. Prior to his tenure at Itron, Mr. Mezey served as the VP of Software Development at Silicon Energy. He became a part of Itron's team following its acquisition of Silicon Energy in 2003.

- **Marcel Regnier:** Mr. Regnier has served as the President and Chief Operating Officer of Itron's global water segment since March 2011. Mr. Regnier joined Itron in April 2007 following the acquisition of Actaris. At Actaris, Mr. Regnier was the manager director for the company's water and heat business unit for seven years. Mr. Regnier had been with Actaris since its inception in 2001, and at Schlumberger before that.

- **Simon Pontin:** Simon Pontin was named Chief Technology Officer in January 2011. Mr. Pontin joined Itron (back then it was Schlumberger Electricity) in 1989. In 2006, he took the reins in developing Itron's smart grid solution, OpenWay.

- **Steven M. Helmbrecht:** Mr. Helmbrecht was named SVP and Chief Financial Officer in January 2005. He joined Itron in 2002 serving as the VP and General Manager of Itron International. Before that, Mr. Helmbrecht served as the CFO of LineSoft Corp., a provider of engineer design software to the electric utility industry. LineSoft was acquired by Itron in 2002. Mr. Helmbrecht spent seven years at SS&C Technologies prior to LineSoft.

- **John Holleran:** Mr. Holleran joined Itron in 2007 to serve as the SVP, General Counsel and Corporate Secretary. Prior to joining, Mr. Holleran spent 27 years with the legal department at Boise Cascade.

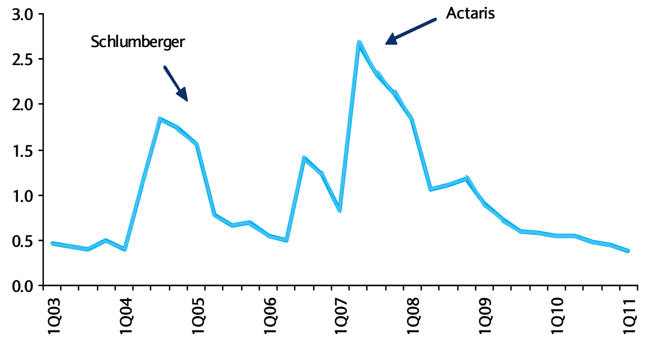
ITRI – Investment Outlook

An Improved Capital Structure

In our view, Itron has materially improved its capital structure in recent quarters.

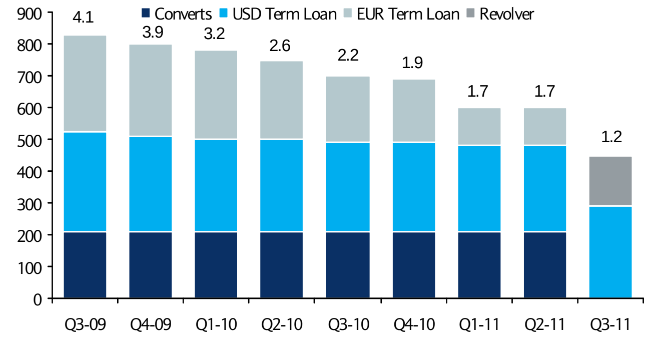
Itron's balance sheet has roughly $130 million in cash on hand, representing some 9% of its market capitalization. Itron's cash balance mainly serves as liquidity for acquisitions. We note that the company has made a concentrated effort to improve its balance sheet in recent months. Itron has been working to deleverage its balance sheet to approximately $496 million of total debt and $481 million of outstanding long-term debt since its $1.6 billion debt balance in 2007 (in tandem with its acquisition of Actaris). In 3Q11, Itron retired $224 million in convertible notes and refinanced its senior debt bringing down its interest expense levels below 2% in the near term. The total–debt-to-equity ratio of the company has decreased from 66% in 2007 to 46.3% in 2011 and its debt-to-EBITDA ratio stands at 1.2x. Itron has a pattern of levering up following "transformational" acquisitions followed by a series of efforts to deleverage.

Figure 102: Itron's Historical Debt to Equity



Source: FactSet, Barclays Capital

Figure 103: Itron's Historical Debt to EBITDA



Source: Company Reports

With expansion plans set to double its revenues driven by 35% of inorganic growth by 2015 still on the table, the company would have to materially lever its balance sheet to grow inorganically. Itron is taking a more proactive approach with its balance sheet considering the company announced its $100 million share repurchase program that will span the next 12 months.

Management Outlook: A Renewed Focus

Following this year's third quarter results, management reiterated its guidance of fiscal 2011 revenues of $2.3-2.4 billion. This implies 4Q11 revenues of $500-600 million. As indicated earlier, the company is currently in the midst of a restructuring plan that is expected to save Itron approximately $30 million by 2013. Within the plan, Itron is closing six manufacturing facilities and implementing changes to 25 others while reducing 7.5% (750) of its employees.

For 2012 and onwards, management guided in its earnings call that FY12 revenues will be flat to down 5% driven by growth in gas and water revenue and a decline in electric revenue. Additionally, with its recent repayment of its outstanding convertible bonds and refinancing of its senior secured debt, Itron expects declines in revenue to be offset by reduced interest expense, warranty charges, and restructuring charges.

In our view, management is currently expressing the tone of “it’s not as bad as you think.” We believe management is highlighting to investors that it knows the areas where the company needs improvement (i.e., its European presence, better quality products, and fewer write downs) and is prepared to work toward it. This is not to say that achieving its outlook is an easy task. Based on the company’s own estimates, it forecasts a $300 million shortfall next year. This means that it needs to win: 1) additional business in the United States from smaller utility awards or inherently slower adopters (water and gas), and 2) business in international markets. Thus even hitting a 5% decline in sales has some execution risk.

Estimates and Valuation

Our current estimates call for $2.25 billion in revenues in 2012, down 4% y/year from our estimate of $2.35 billion in 2011. We expect Itron to benefit from its restructuring efforts, improving its gross margin marginally and keeping operating expenses relatively stable. Our 2012 EPS outlook is $3.93. Our 2013 revenue estimate is $2.34 billion. We expect the remainder of Itron’s cost reduction initiatives to filter though 2012, providing both gross- and operating-margin support. Currently, Itron trades at 9x our CY13 EPS estimate of $4.10, below its recent recessionary lows of roughly 10x and at a discount to peer Elster (roughly 10x our CY13 EPS estimate).

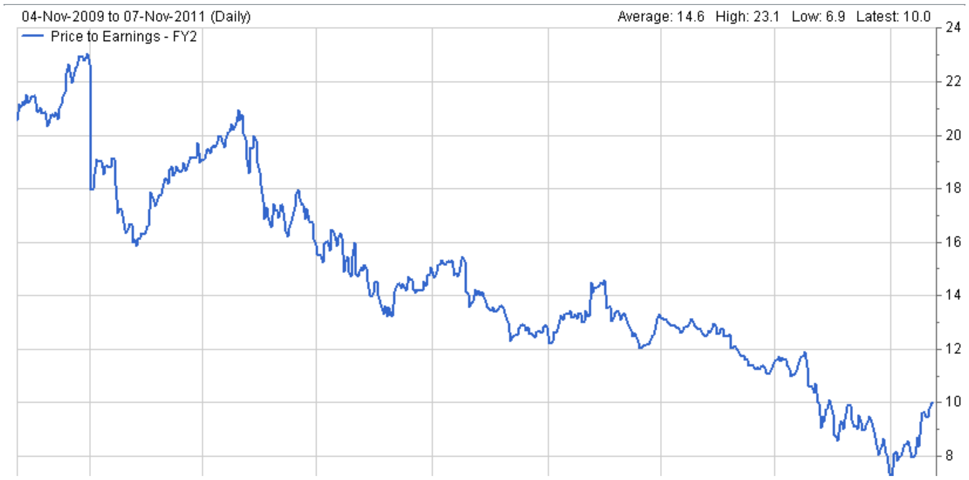
Figure 104: SmartGrids: Comparable Companies Analysis

($ in millions except per share data)															Calendar Year Trading Multiples				
		Price as of	Market	Firm		Calendar Year Sales			Calendar Year EPS			Price to Sales			EV / Sales			PE	
Company	Ticker	11/7/11	Capitalization	Value	2011E	2012E	2013E	2011E	2012E	2013E	2011E	2012E	2013E	2011E	2012E	2013E	2011E	2012E	2013E
ENERGY STORAGE																			
Badger Meter	BMI	32.91	497.6	494.5	264.4	273.8	280.1	1.48	1.59	1.64	1.9	1.8	1.8	1.9	1.8	1.8	22.2	20.7	20.1
Echelon	Elon	5.83	247.4	225.6	155.1	178.0	200.9	(0.38)	(0.20)	0.05	1.6	1.4	1.1	1.5	1.3	1.1	NM	NM	NM
EnerNOC	ENOC	9.80	250.3	96.9	288.6	291.2	423.2	(0.34)	(0.84)	0.79	0.9	0.9	0.2	0.3	0.3	0.2	NM	NM	12.4
ESCO Technologies	ESE	30.74	818.3	925.9	692.6	732.8	826.5	1.96	2.25	2.54	1.2	1.1	1.1	1.3	1.3	1.1	15.7	13.7	12.1
Elster	ELT	14.20	1,602.9	2,143.2	1,876.1	1,922.6	2,023.9	1.10	1.22	1.41	0.9	0.8	1.1	1.1	1.1	1.1	12.9	11.6	10.0
										MEAN	1.3	1.2	1.1	1.2	1.2	1.1	16.9	15.3	13.7
										MEDIAN	1.2	1.1	1.1	1.3	1.3	1.1	15.7	13.7	12.3
										HIGH	1.9	1.8	1.8	1.9	1.8	1.8	22.2	20.7	20.1
										LOW	0.9	0.8	0.2	0.3	0.3	0.2	12.9	11.6	10.0
Itron	**ITRI**	**37.95**	**1,556.0**	**1,922.7**	**2,350.7**	**2,245.4**	**2,337.6**	**4.07**	**3.93**	**4.10**	**0.7**	**0.7**	**0.8**	**0.8**	**0.9**	**0.8**	**9.3**	**9.6**	**9.3**

Source: Company reports, FactSet, and Barclays Capital research. Estimates for non-covered companies are from FactSet.

Although management’s cost reduction initiatives and buyback provide the company with the ability to in part offset the potential impact of revenue declines on its bottom line, visibility on the pace of revenue decline is still limited. While management provided some scope for 2012, we note that the ability to hit its target still requires roughly $180-$300 million in incremental revenue to offset expected AMI revenue declines. Therefore, at present we see limited scope for multiple expansion in the near term. We thus establish a price target of $41 based on a 10x multiple (below its two-year average of 15x) applied to our CY 13 EPS estimate of 4.10

Figure 105: Itron's Two-Year FY2 P/E Trading Range



Source: FactSet

We look for incremental visibility on Itron's ability to garner material international share as a key driver of the shares from current levels.

ENERGY EFFICIENCY PRODUCTS: LIGHTING

Key Trends

LED Penetration into Both Backlighting and General Lighting Is a Matter of WHEN, Not IF…

We believe that a substantial ramp in LED penetration into both Backlighting (consumer devices) and General Lighting (streetlights, overhead lights, lightbulbs) is a matter of WHEN, not IF. We see backlighting migration being driven by an emphasis on thinness, lower battery consumption, and reduced device weight. At the same time, we see the General Lighting migration as being driven by a number of benefits (higher lifetimes, lower maintenance costs, dimming capabilities, ruggedness), with the primary driver being reduced energy consumption/higher energy efficiency.

…However, the Penetration Pace Has Been Slower Than Expected

Although LED penetration into both end markets has been widely anticipated for several years, the rate of penetration over the last 1-2 years has been somewhat slower than initially expected. In TVs, the penetration ramp has been constrained by macro weakness and consumer price sensitivity. In General Lighting, still substantial upfront LED lighting price premiums have also contributed to gradual growth in LED demand thus far. As businesses and consumers alike become more educated on the benefits of LEDs, and rapid declines in both LED chip and system prices compress the upfront premium, we anticipate General Lighting LED demand to accelerate, though we believe this is more of a 2013 and beyond story.

Industry Oversupply Has Accelerated Price Declines and Margin Pressure

With more than 100 companies already participating or looking to enter the LED component market, including 50-plus in China, installed production capacity has ramped substantially in both 2010 and 2011. This, coupled with weaker-than-expected demand growth has resulted in substantial LED oversupply and several quarters of: 1) sub-60% utilization rates for most of the industry; 2) accelerated ASP declines (low to mid-end segment ASP down 30-45% this year); and 3) margin compression.

Key Challenges

Subsidy-Driven Proliferation of Chinese LED Makers Suggests that a Wave of Substantial Consolidation Is Likely Through 2012

The Chinese government's attempt to stimulate a domestic LED industry through equipment subsidies drove Metal Organic Chemical Vapor Deposition (MOCVD) tool shipments to China to ramp from roughly 19 in 2009 to 211 in 2010 and 422 in 2011. Now, with most of these new entrants still struggling with both quality and yield, we anticipate a wave of substantial consolidation in the Chinese market next year, with the number of players likely going from more than 50 to 10 or less. As this consolidation proceeds and the industry oversupply gradually abates, we see MOCVD tool demand in a protracted downturn through 2013.

Industry-Wide Pricing Pressure Highlights that Differentiation Is Hard to Come By

On the one hand, ASPs for low/medium power LEDs (primarily for backlighting applications) have contracted more substantially this year than the ASPs for high power LEDs (primarily for General Lighting applications). On the other hand, ASPs for the latter are still on track to fall 30% or more y/y. We believe this supports our view that: 1) producing high quality 100+ lm/W LEDs is difficult on a volume scale, with only a handful of companies capable of doing so; and 2) true differentiation is nevertheless difficult to come by, with even the Tier 1s not immune to pricing pressure.

Despite Expected Demand Growth, the Industry by and Large Seems Poised for Profitless Prosperity

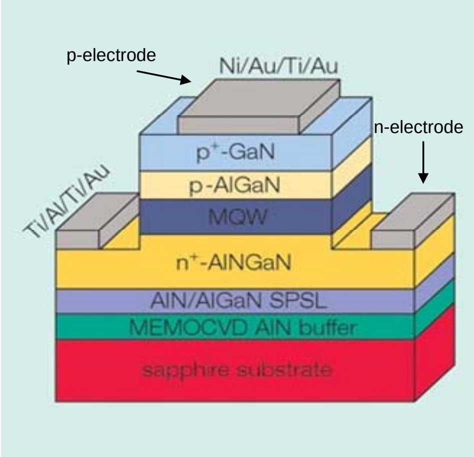
Overall, we believe that the LED industry should see strong unit growth in 2013 and beyond. However, given the increasing commoditization of LEDs and a lack of industry discipline, margins across the industry are unlikely to be inspiring. We believe the players best positioned to either achieve industry-leading cost structures through economies of scale and/or benefit from prolonged lighting design cycles through vertical integration and robust distribution networks, are the ones which will likely enjoy most of the industry profits over the long term.

Industry Background

Basic Construction of an LED Chip

A Light-Emitting Diode (LED) chip consists of several layers of positively and negatively charged semiconductor materials deposited on a substrate. Similar to traditional semiconductor diodes, LEDs emit energy when a specific voltage is applied to them as the positively charged particles (e.g., holes) combine with the negatively charged electrons. The distinguishing feature of LEDs is that the energy emitted by these structures is visible or nearly visible to the human eye in the form of photons, or light.

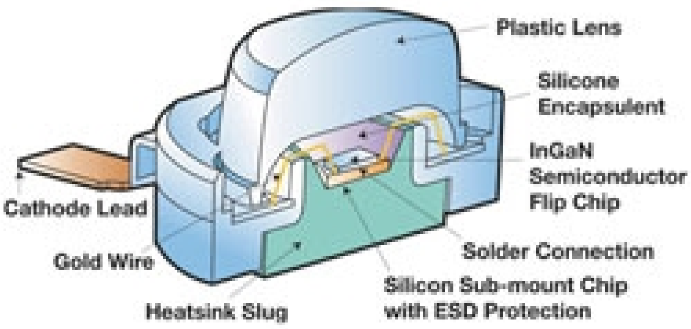
Figure 106: LED Diagram



Source: optics.org

In order to utilize the light-emitting capabilities of this diode, the LED chip is connected to a package via gold wire bonds, fitted with a plastic lens and encapsulant in order to better direct and focus the light, and the fully packaged LED is then attached to a PCB board for integration into various end applications.

Figure 107: Package LED Chip



Source: bftsolar.com

Luminous Efficacy Is the Key Performance Standard for LEDs

Beyond the basic segmentation of LEDs according to the color of the light emitted or the semiconductor materials used, LEDs are more frequently segmented according to their performance characteristics. There are multiple metrics by which LEDs can be evaluated, including:

- The power output of the LED, measured in megawatts (mW)
- Luminous flux, which specifies the total light energy emitted by the LED per unit of time, measured in lumens
- Luminous intensity, which specifies the power emitted by the LED in a particular direction (90% from the surface plane of the LED chip), measured in candelas
- Luminous efficacy, which indicates how efficient the LED is in converting electrical power to light, measured in lumens/watt (lm/W)
- Color rendering index (CRI), which specifies how close the colors of an object illuminated by the LED light resemble those same colors under normal daylight conditions. A CRI in the mid-70s and above indicates superior color rendering, while a CRI below 60 is typically considered poor

Of these metrics, the most widely used measure in the LED industry is luminous efficacy (lm/W), as increasing the input power/drive current into the device can often lead to increased heat generation rather than a higher level of emitted light (i.e., the luminous efficacy declines). Based on data from Yole Développement, increasing the input current level from 20 mA to 1000 mA for an average LED device drives the proportion of optical power output (vs. heat generation) from around 55% to 18%, respectively. Additionally, the luminous efficacy of a device is driven by two components: internal quantum efficiency multiplied by the light extraction/external quantum efficiency. The internal quantum efficiency indicates how much of the current flowing into the LED is converted into light by the LED chip itself. The light extraction efficiency, or external quantum efficiency, indicates how much of the light generated by the LED chip is emitted by the packaged LED. Due to the re-absorption of light by the LED package itself, the light extraction efficiency is typically lower than the internal quantum efficiency. Raising the luminous efficacy of an LED device therefore requires both improvements in the LED chip as well the combination of the fluorescent material and the package.

Advantages and Disadvantages of LEDs

A direct comparison of LEDs and other light sources is difficult given the respective advantages and disadvantages vary by application, environment, and specs. However, the advantages typically boasted by LEDs relative to other light sources (incandescent, linear fluorescent, compact fluorescent, high-intensity-discharge, high pressure sodium) include:

- Lower power consumption/higher energy efficiency
- Typically longer lifetime
- No mercury content
- Superior durability

The key setbacks for LEDs relative to other lighting technologies include:

- Relatively high cost (although LED pricing continues to decline and the relative pricing metric varies when factoring in lifetime, cost of ownership)
- Still limited standardization across the industry in reporting performance, lifetime, CRI,

Competitive Landscape

Leadership Is Shifting Away from Japan, With Korea Picking Up Steam

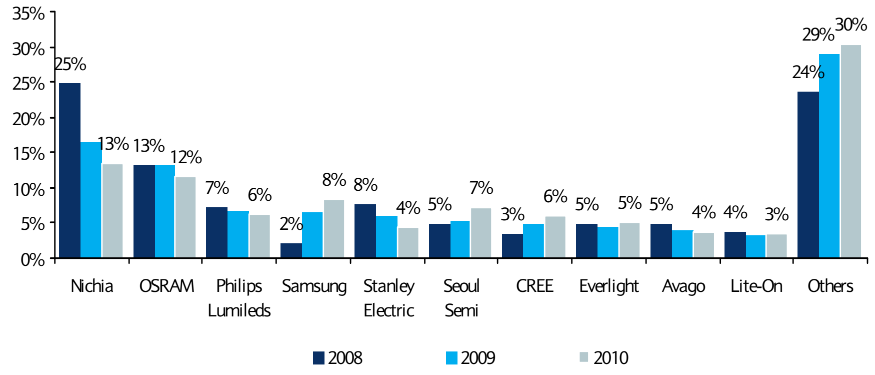
The market share estimates in the figure below are based on revenues for packaged LED devices. There are several key points to be drawn from this data, including:

1) The LED market remains highly fragmented

2) There has been a noticeable decline in the market positioning of Japanese LED makers (e.g., Nichia, Stanley Electric) with Korean LED makers like Samsung and Seoul Semi picking up momentum, and

3) The emergence of China as a major center for both LED demand and supply will likely drive Chinese makers to enter this list in the coming years, though we'd note that the quality of LEDs manufactured by the established Chinese LED makers remains sub-par.

Figure 108: LED Market Share Breakdown (2008-10 Revenues)



Source: Gartner

Demand Analysis

Demand Overview

The mass adoption of LEDs across a wide variety of consumer electronics devices and applications has come in waves. The first driver of significant LED demand was handset penetration, as handset manufacturers began to integrate LEDs into handsets for both keypad illumination and color screen backlighting in the early 2000s. Concurrent with this adoption was the emergence of other small mobile devices, ranging from digital cameras to MP3 players to GPS devices, all of which began to adopt LEDs for their small-sized screens. Similar to the cyclicality of other technologies (semiconductors, LCD displays), the widespread adoption of LEDs in mobile devices drove the first boom-bust cycle in the LED industry. LED manufacturers aggressively added capacity, supply overshot demand, and pricing dropped sharply. And similar to semiconductors and LCDs, this rapid deterioration in pricing drove the next wave of LED adoption for larger displays, i.e., notebook PCs.

The substitution of LED backlights for Code Cathode Fluorescent Lamp (CCFL) backlights in notebooks permitted much thinner, lighter, and less power-consuming devices. And as LED efficiency continued to ramp, driving down the price per lumen, the last year has seen the emergence of the second wave of LED demand, with the central application being LCD TV backlights.

The rapid conversion of LCD TVs to LED backlights should drive substantial growth in LED demand in the next two years. However, the LED application that has the potential to dwarf these two LED cycles, in our view, is the emergence of “general illumination” and “solid state lighting.” While these umbrella terms encompass everything from LED lightbulbs to streetlamps to architectural illumination, the evolution of the lighting supply chain and the pace of LED adoption in this segment are the keys to the secular growth potential for LEDs over the long term.

Backlighting LED Demand – Revenue Growth Has Moderated

LEDs have penetrated consumer devices such as handsets, notebooks, tablets, monitors, and TVs primarily through the backlighting function. Key application categories are:

- **Handsets**: The acceleration in LED demand from the handset space from the early 2000s has been driven by several factors, including: 1) handset proliferation; 2) LED deployment for keypad illumination; 3) LED deployment for handset screen backlighting; 4) the emergence of the smartphone category, which typically entails larger screen sizes; and 5) the adoption of ultra high brightness LEDs for the flash function in camera handsets. Partially offsetting this growth has been the increasing brightness and performance of LED chips, which would require fewer LEDs per device all else being equal, as well the growing handset market penetration by Organic Light Emitting Diode (OLED) screens. *In total, we estimate LED revenues to the handset and small mobile devices segment will see modest annual declines from the 2011 level of approximately $1.35 billion to $1 billion in 2015.*

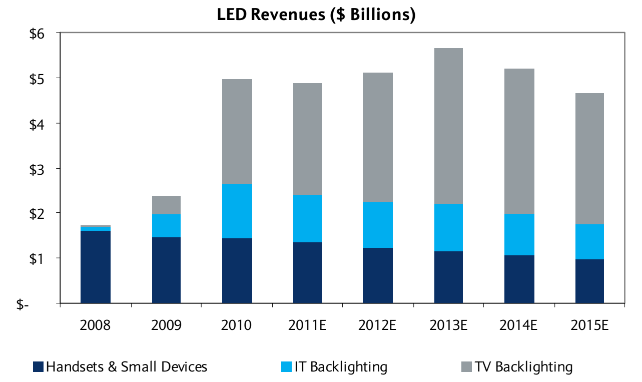
- **Notebooks/Tablets**: The key benefits of LEDs, including energy efficiency and thinner profiles, were particularly well suited for notebooks, as longer battery life and thin form factors were areas of differentiation for the notebook manufacturers. Additionally, the incremental cost of using LED backlights could be relatively easily embedded in the average price of a notebook, particularly given that an average notebook only required around 40-45 LED chips. For this reason, LED penetration into the core notebook segment proceeded very rapidly, with the penetration rate ramping from 1% in 2007 to 48% in 2009, and 99% this year. The introduction of netbooks and tablet PCs, where thinness and battery life are of even more importance, assured that nearly 100% of these notebook sub-segments used LED backlights. *In total, we estimate LED revenues to the notebook/tablet/netbook segment will decline annually from $570 million in 2011 to $314 million in 2015.*

- **Monitors:** Adoption in the LCD monitor market has lagged these mobile applications as the superior energy efficiency of LEDs was not a sufficient justification for the added cost premium of LED modules, as well as the incremental loss in color rendering. The initial adopters of LED backlights in monitors used red, green, and blue LEDs in order to maintain a wide color gamut. However, the increasing migration from direct-lit designs (LEDs distributed across the back of the display) to edge-lit designs (LEDs distributed around the perimeter) using white LEDs, color filters, and light guide plates has enabled panel makers and monitor makers to produce LED-lit panels with comparable brightness and color rendering specs to CCFLs and fairly small price differentials (the current price premium on LED-lit monitor vs. CCFL-lit monitor panels of the same screen size is around $9). *In total, we estimate LED revenues to the monitor segment will* *grow from roughly $480 million in 2011 to more than $600 million in 2013, before declining to the $450-500 million range in 2015. .*

- **LCD TVs**: With the rising price premiums on LED-lit panels limiting the price-elastic consumer demand necessary to drive widespread LED TV penetration, panel makers and TV OEMs have been pursuing various means of improving both their component procurement and the technology in the TVs themselves in order to drive the per-set LED requirements lower. Key efforts include improve light guide plates, optical film innovation, and better panel transmittance. The net implication of all these efforts for the LED makers is the declining number of LEDs per TV panel. This is driving the edge-lit TV panel design to move from six LED light bars per panel to four light bars to eventually only one or two. In total, factoring in: 1) high single-digit growth in LCD TVs for the next several years, supported by penetration into emerging economies and accelerating TV replacement in developed economies; 2) a substantial ramp in LED penetration into the LCD TV backlighting market; 3) the transition away from direct-lit TVs to edge-lit TVs; and 4) the progression in edge-lit models from six lights bars to four to two to one, we believe that the LED opportunity in the TV segment is significant, though the actual revenue ramp will continue to be weighed down by pricing pressure. *In total, we estimate LED revenues to the TV segment will grow from approximately $2.5 billion in 2011 to around $3.5 billion in 2013, before declining to the $2.9 billion level in 2015. .*

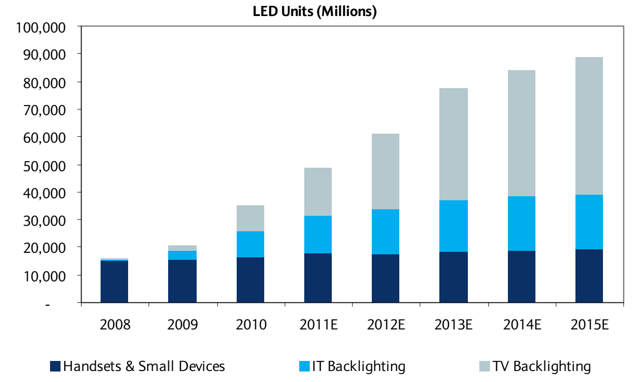
In total, we estimate that the combination of these backlighting applications should drive a 16% LED unit CAGR through 2015, even as the associated revenues should see a relatively flattish CAGR due to continued pricing pressure (30-45% reduction in 2011, 20+% likely in 2012) and a reduction in the number of LEDs per device.

Figure 109: Backlighting-Related LED Revenues



Source: Barclays Capital, Gartner, Strategies Unlimited

Figure 110: Backlighting-Related LED Units



Source: Barclays Capital, Gartner, Strategies Unlimited

General Lighting LED Demand – The Focus Remains on the Pace of Adoption

Benefits of LEDs vs. Incumbent Lighting Solutions

The benefits that LED lamps and fixtures offer vs. existing lighting solutions (incandescent, fluorescent, compact fluorescent, halogen, high intensity discharge) are multiple and significant. These include:

- **Significantly Higher Lifetimes**: Today's LED lamps boast lifetimes of over 50,000 hours at a 70% lumen maintenance (L70) vs. corresponding lifetimes of 1,000 hours for incandescent lamps and 10,000 hours for compact fluorescent lamps (CFLs).

- **Superior Energy Efficiency**: One of the central benefits of LEDs as compared to incumbent solutions is the meaningfully higher energy efficiency (as measured in lumens/watt). The leading LED solutions in mass production today operate at 100-130 lm/W vs. 10-20 lm/W for incandescent lamps, 55-65 for CFLs, 80-100 for fluorescent lamps, and 80-120 for high intensity discharge (HID) lamps. Going further, efficiency improvements in the incumbent various lighting solutions have essentially plateaued, whereas LED efficiency has continued to improve yearly along an upward-sloping trend-line, and has significant room for further expansion in the years to come.
- **Lower Maintenance Costs**: As a result of the longer lifetimes of LED lights, they are much cheaper to maintain than traditional light sources, with the less frequent replacements implying fewer associated labor hours. This benefit is much more pronounced in the industrial and commercial lighting segments, as companies and organizations have to actually pay for the labor associated with bulb/fixture replacement.
- **No Toxic Materials**: Unlike many of the other lighting solutions, LEDs contain no mercury, lead, or heavy metal, and emit no UV radiation.
- **Evenly Distributed, Directional Light**: Unlike traditional light sources which often illuminate a surface area unevenly with hot spots directly below the light and weaker illumination elsewhere, LEDs cast even directional light, implying that no optical power is wasted.
- **Infinitely Dimmable**: The nature of LED lights enables them to be dimmed to any specific level fairly easily, enabling more sophisticated lighting solutions and further energy savings.
- **Digitally Controllable**: Similarly, LEDs can be paired up with digital IC drivers/controllers for sophisticated, smart-lighting solutions. Today, each LED lighting fixture can include daylight, occupancy and/or thermal sensors for under 20 cents.
- **Very Rugged**: Given LEDs are based on a semiconductor process and contain no delicate elements such as filaments, they are inherently more rugged and better suited for commercial applications.

Energy Savings – The Key LED Lighting Value Proposition

Unlike consumer electronic devices, where the much slimmer form factors of LEDs play as much of a part in their adoption as their lower battery use, lower energy consumption is the key value proposition in installing LED lighting as opposed to traditional solutions. The U.S. Energy Information Administration estimates that worldwide electricity consumption is on track to grow 17% from 2007 to 2015, with 14% growth by 2020 and 13% growth by 2025. The residential and commercial end markets — the segments particularly attractive for LEDs — will continue to account for 50-55% of worldwide electricity consumption. Digging deeper, industry estimates suggest that lighting accounts for roughly 19% of global electricity consumption (or 2.651 TWh). In the United States, this percentage is even higher at around 22% of total electricity consumption, with commercial accounting for 59% of consumption, residential at 27%, and industrial at 14%. In light of these high electricity consumption levels by lighting alone, companies such as Philips have estimated that replacing existing lighting fixtures worldwide with solid state lighting solutions such as LEDs would reduce lighting energy consumption by approximately 30%, which would equate to 44 1,000MW power plants and/or savings of more than $30 billion per year.

China's electricity consumption is projected to double by 2020.

A geographic analysis is likewise revealing. Currently, the largest consumers of electricity worldwide are the United States at 22%, Europe at 19%, and China at 17%. However, based on the current growth outlook, estimates suggest that China's electricity consumption will essentially double by 2020, contributing the vast majority of the worldwide electricity consumption growth. What's the takeaway here? The value proposition of electrically efficient LED lighting is very appealing for developed regions such as the U.S. and Europe; however, China stands to gain the most from making the LED transition early on.

Government Efforts Adding One More Adoption Driver – Incandescent Bulb Phase-Outs

The US will phase out incandescent bulbs in 2012-14.

In an effort to accelerate the conversion of residential and commercial lighting to more energy efficient solutions and reduce both the cost and environmental impact of traditional lighting, governments around the world have put in place legislation to ban or phase out incandescent bulbs (a roughly 15 billion unit installed base). The figure below lists the various programs that have been enacted worldwide on this front. We'd highlight that incandescent ban deadlines are rapidly approaching in both Europe and the U.S. in 2012, and that there is increasing industry speculation that China is likely to ban sales of 100W incandescent bulbs in October 2012, with 60W+ bans in 2014.

Figure 111: Global Light Bulb Related Legislation

Region	Country	Legislation	Deadline
North America			
	U.S.	Phase out sale of incandescent bulbs (Energy Independence Act of 2007)	2012-2014
		All bulbs to operate at a minimum efficacy level of 45 lumens per watt	2020
	Canada	Ban incandescent bulbs	2012
Europe			
	Ireland	Ban incandescent bulbs	2009
	France	Ban incandescent bulbs	2010
	UK	Voluntarily phase out sale of incandescent bulbs	2011
	Italy	Ban incandescent bulbs	2011
	Overall EU	Ban incandescent bulbs	2012
Asia			
	Philipines	Ban incandescent bulbs	2010
	Japan	Ban incandescent bulbs	2012
	India	Replace existing incandescent bulbs with CFLs	2012
	Taiwan	Ban incandescent bulbs	2013
	Russia	Ban incandescent bulbs	2014
	China	Phase out incandescent bulbs	2017
South America			
	Cuba	Banned incandescent bulbs/switched entirely to CFLs	2005
	Argentina	Ban incandescent bulbs	2010
	Venezuela	Replace existing incandescent bulbs with CFLs	?
	Brazil	Ban incandescent bulbs and subsidize CFLs	2013?
Oceania			
	Australia	Banned incandescent bulbs	2009

Source: Barclays Capital, official government announcements

LED Paybacks Becoming Attractive

While payback schedules tend to vary project by project, based on: 1) the competing/incumbent lighting technology; 2) installation and maintenance costs; 3) the amount of time per day that the light is on; and 4) the cost and efficacy of the LED solution, we outline some rough payback metrics below:

- **Streetlights:** We estimate 4.5 years for new installations and 8.5 years for retrofit installations
- **Commercial/Industrial**: We estimate one year for new construction and four years for retrofit installations
- **Residential**: We estimate three years for new construction and three years for retrofit installations as compared to incandescent bulbs

Total LED Industry Revenue Growth Likely Fairly Subdued in 2011-12; We See 2013 as the More Likely Inflection Point

Coming off of a very low base, General Lighting LED revenues are on track to grow 28% in 2011 to $1.5 billion, by our estimates. Nevertheless, this would still reflect LED fixture/luminaire penetration of only 1-2% of worldwide unit shipments (higher on a revenue basis) and 1-2% penetration of the worldwide installed base. And driven by a ramp in LED penetration into commercial/industrial applications as well as streetlights, we estimate LED revenues in General Lighting will grow to around $2.1 billion in 2012 and $4.8 billion in 2015.

Taking this growth outlook for General Lighting and more subdued trends in Backlighting, we see total industry LED revenues growing modestly in both 2011 and 2012 (+3%/+10%, respectively), with more meaningful growth in 2013.

Figure 112: LED Demand by Segment

Revenues (Millions)	2008	2009	2010	2011E	2012E	2013E	2014E	2015E
Handsets & Small Devices	$ 1,610	$ 1,477	$ 1,446	$ 1,353	$ 1,226	$ 1,148	$ 1,054	$ 982
IT Backlighting	$ 94	$ 490	$ 1,205	$ 1,052	$ 1,000	$ 1,051	$ 933	$ 776
TV Backlighting	$ 33	$ 417	$ 2,319	$ 2,479	$ 2,891	$ 3,465	$ 3,206	$ 2,893
General Lighting	$ 469	$ 533	$ 1,195	$ 1,530	$ 2,074	$ 2,695	$ 3,821	$ 4,810
Other	$ 1,052	$ 995	$ 1,005	$ 964	$ 921	$ 916	$ 855	$ 818
Total	**$ 3,257**	**$ 3,912**	**$ 7,170**	**$ 7,379**	**$ 8,112**	**$ 9,274**	**$ 9,870**	**$ 10,278**
Y/Y		*20%*	*83%*	*3%*	*10%*	*14%*	*6%*	*4%*

Source: Barclays Capital

Supply Analysis – We Believe Industry Overcapacity Is Likely to Drive a Multi-Year Contraction in Capacity Additions

We See Limited Reasons for LED Makers to Add Capacity in 2012

Although LED pricing declined precipitously in 1H11, most companies anticipated some stabilization and/or recovery in 2H11, as seasonally stronger TV sales absorbed the BLU-leveraged LED output and allowed the LED makers to raise their utilization levels. With 3Q11 now behind us, it is clear that this recovery never materialized. Overall LCD TV sell-through has been somewhat pressured by the weakening macro environment, with 2011 shipment forecasts coming down from 215 million-plus at the start of the year to our current estimates of 205-208 million. LED penetration into the LCD TV space has also been slower than expected, impacted further by an accelerated push by the TV OEMs to reduce the number of LEDs used per TV (although the individual chip area has expanded). As a result, capacity utilization levels at both the Korean and Taiwanese LED makers have hovered in the mid-50s or below in both 2Q11 and 3Q11. Additionally, many of these companies do not anticipate a recovery in the LED BLU market until 2H12 at the earliest, with some pointing to 2013. As a result, we look for MOCVD demand out of Taiwan and Korea to decline 40% and 30% y/y, respectively, in 2012.

China Market Likely to See Substantial Consolidation Next Year

While the Korean and Taiwanese are likely to focus on absorbing existing capacity and raising their utilization levels in 2012, we believe the Chinese market is likely to see a substantial amount of consolidation next year. We see GCL's exit from the market (before even starting any production) as the first in likely many market exits, similar to what we saw in the Taiwan market several years ago. As a result, we estimate that Chinese tool demand in 2012 is likely to decline approximately 50% y/y to around 211 tools.

We'd also note that there has been increased speculation recently regarding the potential impact of used tools on demand if/when certain LED makers decide to exit the industry. And here we'd note that the implications are still not clear. On the one hand, our checks suggest that used MOCVD tools have begun to appear on the market in China. On the other hand, conversations with select LED makers indicate a real reluctance to purchase used tools (even if they're advertised as "unpackaged"), as they are likely "tainted" by the recipe run by the original owner. So stay tuned on this front.

We Estimate 2012 MOCVD Demand of 400 Tools, Growing to 440 in 2013

In total, we forecast that 2012 MOCVD demand will decline 40-45% y/y to 400 tools, including 211 to China, 96 to Taiwan, 43 to Korea, 34 to US and Europe, and 16 to Japan. Looking to 2013, barring a substantial ramp in general lighting related LED demand (i.e., assuming the LED demand growth in this market is more gradual), we look for China tool demand to decline modestly, offset by 20-40% y/y tool demand growth in the other regions. We therefore forecast the 2013 MOCVD market at 440 tools.

Figure 113: MOCVD Tool Outlook by Region

	2009	2010	2011E	2012E	2013E
China	19	211	422	211	190
Japan	13	35	14	16	19
Korea	88	270	62	43	59
Taiwan	76	241	160	96	125
USA & Europe	9	42	42	34	47
MOCVD Tool Total	**205**	**798**	**700**	**400**	**440**

Y/Y	2009	2010	2011E	2012E	2013E
China		1002%	100%	-50%	-10%
Japan		171%	-59%	15%	20%
Korea		207%	-77%	-30%	35%
Taiwan		217%	-34%	-40%	30%
USA & Europe		343%	0%	-20%	40%
MOCVD Tool Total		**289%**	**-12%**	**-43%**	**10%**

Source: Barclays Capital

We Look For Veeco's Share to Stabilize in the Low 50s and Aixtron's in the Low 40s

Given this regional MOCVD demand outlook in 2011-13, we expect Veeco's market share to stabilize in the low 50s and Aixtron's in the low 40s. For Veeco, the company's strong positioning in the China market in 2010-11 coupled with its rapid product introductions, has allowed the company to finally surpass Aixtron from a market share perspective this year (we estimate Veeco's market share at 52% in 2011, with Aixtron's at 43%). Looking to 2012-13, while we have assumed Veeco's market share in Taiwan ramps up from 40% in 2011 to 45% in 2012 and 48% in 2013, the declining demand out of China is likely to dampen the overall market share expansion. In Korea, we do not anticipate a major change in the market share distribution, with Samsung largely purchasing from Aixtron and LG and Seoul Semi largely purchasing from Veeco. As a result, we see both companies' market share as largely stable in 2012 and 2013.

CREE INC. (CREE; 2-EQUAL WEIGHT/2-NEU); PRICE TARGET $31

CREE

Stock Rating
2-EQUAL WEIGHT

Sector View
2-NEUTRAL

Price Target
USD 31.00

Price (08-Nov-2011)
USD 31.00

Potential Upside/Downside
0%

Cree Inc.(CREE): Quarterly and Annual EPS (USD)

	2011	2012			2013			Change y/y	
FY Jun	Actual	Old	New	Cons	Old	New	Cons	2012	2013
Q1	0.60A	0.25A	0.25A	0.25A	0.42E	0.42E	0.41E	-58%	68%
Q2	0.55A	0.27E	0.27E	0.26E	0.47E	0.47E	0.44E	-51%	74%
Q3	0.27A	0.30E	0.30E	0.30E	0.50E	0.50E	0.45E	11%	67%
Q4	0.28A	0.35E	0.35E	0.37E	0.47E	0.47E	0.49E	25%	34%
Year	1.70A	1.17E	1.17E	1.18E	1.87E	1.87E	1.80E	-31%	60%
P/E	18.2		26.5			16.6			

Source: Barclays Capital
Consensus numbers are from Thomson Reuters

COMPANY SNAPSHOT

Cree Display & Lighting

Income statement ($mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	1,024	1,043	1,436	1,663	17.5%
EBITDA	350	199	290	373	2.1%
EBIT	254	72	142	225	-3.9%
Pre-tax income	262	83	153	236	-3.5%
Net income	205	68	120	185	-3.4%
Reported EPS ($)	2.18	1.07	1.55	2.10	-1.2%
Diluted shares (m)	104	110	117	120	4.8%
Dividend per share ($)	-	-	-	-	NA

Margin and return data (%)					Average
EBITDA margin	34.2	19.1	20.2	22.4	24.0
EBIT margin	24.8	6.9	9.9	13.5	13.8
Pre-tax margin	25.6	8.0	10.7	14.2	14.6
Net margin	20.0	6.6	8.4	11.1	11.5
ROIC	10.2	3.2	5.7	7.4	6.6
ROA	9.4	2.9	5.2	6.7	6.0
ROE	10.2	3.2	5.7	7.4	6.6

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	1,954	1,652	1,866	2,137	3.0%
Intangible fixed assets	430	1,004	1,004	1,004	32.7%
Cash and equivalents	1,111	598	725	910	-6.4%
Total assets	2,384	2,656	2,870	3,142	9.6%
Short and long-term debt	-	-	-	-	NA
Other long-term liabilities	195	237	275	299	15.4%
Total liabilities	195	237	275	299	15.4%
Net debt/(funds)	(1,111)	(598)	(725)	(910)	NA
Shareholders' equity	2,189	2,419	2,595	2,843	9.1%
Change in working capital	74	41	29	31	-24.8%
Operating cash flow	314	425	298	364	5.1%
Capital expenditure	(252)	(207)	(170)	(180)	NA
Free cash flow	62	217	128	184	43.9%

Valuation and leverage metrics					Average
P/E (x)	14.2	29.1	20.0	14.7	21.1
EV/EBITDA (x)	8.4	39.1	20.4	12.5	22.6
FCF yield (%)	1.9	6.4	3.5	4.9	0.0
Price/sales (x)	3.2	3.3	2.5	2.2	3.0
Price/BV (x)	1.5	1.4	1.4	1.3	1.4
Dividend yield (%)	-	-	-	-	-
Total debt/capital (%)	-	-	-	-	-

Selected operating metrics (mn units)				
LCD TV Shipments	192	205	230	252
Total PC Shipments	340	352	370	387

Source: Company data, Barclays Capital; all estimates are based on Calendar Year

Stock Rating	2-EQUAL WEIGHT
Sector View	2-NEUTRAL
Price (08-Nov-2011)	31.00
Price Target	31.00
Ticker	CREE

Investment case

Our $31 price target is based on 20x our CY12E EPS of $1.55.

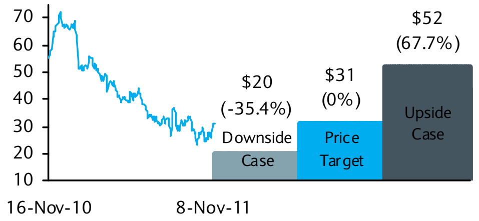
Upside case 52.00

Our upside case of $52 is based upon 20x our upside CY12 EPS of $2.60, which assumes ~35% component revenue growth, continued growth in systems, and ~42% GMs.

Downside case 20.00

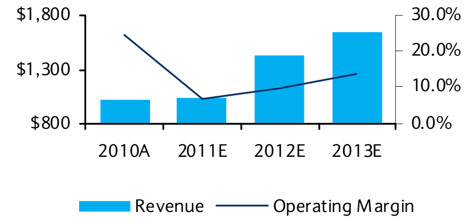
Our downside case of $20 is based upon 20x our downside CY12 EPS of $1.00, which assumes component/chip unit growth is offset by ASP declines and GMs gradually decline from ~38.5% to ~36. It also equates to 1x book value per share of ~$20.

Upside/downside scenarios



Source: FactSet

Revenue ($mn) and Operating Margin



Note: FY end June

Cree – Investment Thesis

We consider Cree a leading player in the LED market. Through the company's component and systems businesses, the company is highly leveraged to improving trends of LED adoption in General Lighting sales driven in part by the rise of a variety of government efficiency and respective energy policy initiatives across the globe. Following its public debut in 1993, Cree has participated in every aspect of the LED market. With its most recent acquisition of Ruud Lighting, management is looking to accelerate its move downstream to fixtures and lighting systems in order to drive broader adoption of LED systems thereby enhancing sales opportunities for its component business.

We continue to weigh several near-term risks — continued pricing pressure in mid/low-end LEDs, a slow ramp in General Lighting demand, limited clarity on pathway to gross margin growth given still low utilization, and a smaller net cash buffer following the Ruud Lighting acquisition — with the longer term positives of the story — increasing number of government supporting the transition to LED lighting, incandescent lightbulb bans kicking in 2012-13, price-elasticity driven pick-up in demand from commercial/industrial users as LED ASPs come down. And with shares trading at 20x our CY12 non-GAAP EPS of $1.55, we believe CREE shares are fairly valued, supporting our 2-Equal Weight/2-Neutral rating and $31 price target (based on 20x our CY12 non-GAAP EPS estimate of $1.55).

CREE – Investment Positives

Cree Continues to Hold a 1-2 Year Lead Over LED Competition

Although multiple LED makers have claimed the ability to manufacture 100+ lm/W LEDs on a volume scale, our checks continue to suggest that this capability remains confined to a handful of players. And based on the recent announcements from Cree, the company is now mass-producing 140 lm/W LEDs, with 231 lm/W already proven in R&D. As a result, we believe that the company continues to enjoy a 1-2 year technology lead over the majority of LED manufacturers worldwide.

Margins Have Held in Better Than Peers

With overall LED ASPs declining 30-45% in 2011, depending on the product, operating margins at many LED makers in Taiwan, Korea, and China have contracted to negative levels. And while Cree's gross margin has declined from 49.5% in 2Q10 to 36.8% in 3Q11, with operating margin down from 26% to 5% in the same period, this performance still exceeds industry peers.

Push Downstream Allows the Company to Benefit from Its Industry-Leading Components and Potentially Drive Market Adoption

Cree's push downstream was already seeing momentum in 1H11, supplemented further by its August 2011 acquisition of Ruud Lighting. And given the combined business is leveraged primarily to North American streetlight and outdoor applications, we see demand and revenues in this segment ramping through 2012. This vertical integration and push downstream should in turn allow Cree to: 1) capitalize on its industry-leading LED quality/efficacy; 2) optimize the system design around its own components; and 3) potentially accelerate LED lighting adoption.

CREE – Investment Risks

Further Gross Margin Compression Still Remains a Concern

While management's guidance for flattish gross margins in 4Q11 in the 36-37% range does suggest that margins have generally stabilized in the near term, further margin compression does remain a concern assuming utilization levels do not recover and/or ASP declines in 2012 and beyond offset underlying unit growth.

Vertical Integration May Alienate Key Fixture/Luminaire Customers

We believe management has factored in some level of customer attrition with respect to its combined LED Fixture business outlook, likely from some tier-2 suppliers which are not as reliant on high quality solutions and thus may be skittish about continuing to purchase components from Cree. In our view, tier-1 vendors such as OSRAM and Philips already have component and systems in house, and tier-3 vendors are still dependent on high quality components in order to drive systems sales, making vendors in both categories unlikely to diversify their LED purchases away from Cree. That said, this does remain a longer-term concern.

Decelerating LED Revenue Growth May Drive Multiple Compression

In our bottom-up LED industry demand model, we are assuming strong lighting-related LED industry revenue growth in 2012 and beyond, partially offset by sluggish backlighting-related revenues, contributing to muted overall industry revenue growth in both 2011 and 2012. Given this multi-year muted growth outlook, we could see investors question the sizeable premium embedded in Cree's valuation.

CREE – Our View

Big picture, we believe shares are fairly valued at current values, as the longer-term growth potential is balanced by margin concerns and uncertainty regarding the competitive implications of Cree's push downstream. We believe a more positive outlook on the name would require some combination of the following factors, including: 1) visibility to margins heading higher; 2) moderation in quarterly ASP declines; and/or 3) continued acceleration in Cree's Fixture business.

AIXTRON AG (AIXG; 2-EQUAL WEIGHT/2-NEU); PRICE TARGET $11

AIXA GY / AIXGn.DE

Stock Rating
2-EQUAL WEIGHT

Sector View
2-NEUTRAL

Price Target
EUR 8.00

Price (08-Nov-2011)
EUR 11.20

Potential Upside/Downside
-29%

Aixtron AG(AIXGn.DE): Financial and Valuation Metrics EUR

FY Dec	2009	2010	2011	2012	2013
EPS	0.48A	1.89A	1.06E	0.40E	0.50E
Previous EPS	0.48A	1.89A	1.06E	0.40E	0.50E
Consensus EPS	N/A	N/A	N/A	N/A	N/A
P/E	23.3	5.9	10.6	28.0	22.4

Source: Barclays Capital
Consensus numbers are from Thomson Reuters

COMPANY SNAPSHOT

Aixtron — Display & Lighting

Income statement (EUR mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	784	590	372	400	-20.1%
EBITDA	289	167	68	82	-34.3%
EBIT	276	154	55	68	-37.2%
Pre-tax income	278	156	59	72	-36.2%
Net income	192	108	40	50	-36.2%
Reported EPS ($)	1.89	1.06	0.40	0.50	-35.8%
Diluted shares (m)	102	102	102	102	0.1%
Dividend per share ($)	0.15	0.60	-	-	NA

Margin and return data (%)					Average
EBITDA margin	36.8	28.2	18.3	20.5	26.0
EBIT margin	35.2	26.0	14.7	17.1	23.2
Pre-tax margin	35.5	26.5	15.8	18.1	24.0
Net margin	24.6	18.2	10.9	12.5	16.5
ROIC	38.0	19.6	7.6	8.5	18.4
ROA	27.6	15.4	6.7	7.5	14.3
ROE	38.0	19.6	7.6	8.5	18.4

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	754	510	568	619	-6.4%
Intangible fixed assets	69	68	68	68	-0.4%
Cash and equivalents	385	212	286	331	-4.9%
Total assets	823	578	636	688	-5.8%
Short and long-term debt	-	-	-	-	NA
Other long-term liabilities	223	77	73	74	-30.9%
Total liabilities	223	77	73	74	-30.9%
Net debt/(funds)	(385)	(212)	(286)	(331)	NA
Shareholders' equity	600	501	563	614	0.7%
Change in working capital	83	(54)	(19)	(0)	NA
Operating cash flow	148	(90)	94	65	-23.9%
Capital expenditure	(52)	(26)	(20)	(20)	NA
Free cash flow	96	(116)	74	45	-22.2%

Valuation and leverage metrics					Average
P/E (x)	8.3	14.8	39.3	31.5	23.5
EV/EBITDA (x)	4.4	9.0	24.1	18.6	14.1
FCF yield (%)	6.0	-7.2	4.6	2.8	0.0
Price/sales (x)	2.0	2.7	4.3	4.0	3.3
Price/BV (x)	2.7	3.2	2.9	2.6	2.8
Dividend yield (%)	1.0	3.8	-	-	0.0
Total debt/capital (%)	-	-	-	-	-

Selected operating metrics				
MOCVD Tool Shipments	798	700	400	440

Source: Company data, Barclays Capital; all estimates are based on Calendar Year

Stock Rating	2-EQUAL WEIGHT
Sector View	2-NEUTRAL
Price (08-Nov-2011)	15.73
Price Target	11.00
Ticker	AIXG

Investment case

Our price target of $11 is based on the midpoint of 1-1.5x book value per share of ~EUR 6.25 and a 1.39 EUR/USD rate.

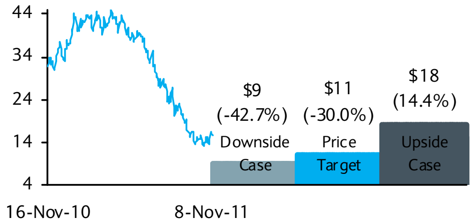
Upside case 18.00

Our upside case of $18 is based upon 12x our upside CY12 EPS of EUR1.06, which assumes a flattish MOCVD market with 2011.

Downside case 9.00

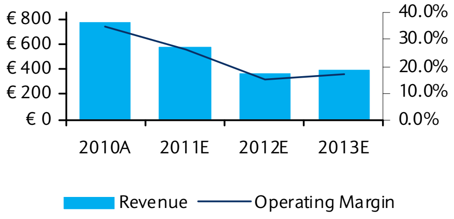
Our downside case of $9 is based on 1x book value per share of ~EUR 6.25 and a EUR/USD rate of ~1.39.

Upside/downside scenarios



Source: FactSet

Revenue ($mn) and Operating Margin



Note: FY end Dec.

Aixtron – Investment Thesis

We believe sentiment for Aixtron will continue to be pressured by structural issues (i.e., LED industry overcapacity and a likely extended equipment demand downturn) as well as company-specific issues (continued share loss to Veeco and still evident relative valuation premium). We believe shares will remain range-bound until visibility improves to a sustainable order recovery and/or a reversal in market share trends. Our rating is 2-Equal Weight/2-Neutral and we maintain our $11 price target based on the midpoint of 1-1.5x book value per share of EUR6.25 and a Euro/USD exchange rate of 1.39.

Investment Positives

Margin Structure Remains Flexible

Despite the 49% q/q decline in 3Q11 revenues, Aixtron's gross margin declined only 80bp to 43%. Looking to 4Q11 and beyond, management expects gross margin to remain at 40+%,.All of this highlights the flexibility embedded in Aixtron's business model.

Orders Approaching a Trough, but Timing and Magnitude of Inflection is Far from Certain

With 3Q11 orders dropping to EUR 52mn, implying MOCVD unit bookings of 34 or below, it does appear that we are approaching a bookings trough. This said, we would caution investors on taking this as a buy signal, given: 1) we could see another leg down from here; 2) we see high potential for orders to bounce around the current low run-rate, given our expectations for the average quarterly revenue run-rate (ex service) in 2012 to be around EUR 83mn; and 3) we believe the downturn is more than a 2-3 quarter dip and is likely to last through 2013.

Demand for Power Electronics Production Equipment Is Beginning to Accelerate

Aixtron's revenues in the "Display & Other" segment have accelerated over the last several quarters, growing from roughly EUR11.5mn in 4Q10 to EUR18.5mn in 3Q11. The bulk of this growth stems from systems intended for the manufacturing of SiC or GaN power electronics. While we believe this industry application is still in the early stages of adoption, this segment could emerge as a growth driver in the coming years.

Investment Risks

We See Limited Reasons for LED Makers to Add Capacity in 2012

Although LED pricing declined precipitously in 1H11, most companies anticipated some stabilization and/or recovery in 2H11, as seasonally stronger TV sales absorbed the BLU-leveraged LED output and allowed the LED makers to raise their utilization levels. With 3Q11 now behind us, it is clear that this recovery never materialized. Overall LCD TV sell-through has been somewhat pressured by the weakening macro environment, with 2011 shipment forecasts coming down from 215 million-plus at the start of the year to our current estimates of approximately 205 million. LED penetration into the LCD TV space has also been slower than expected, impacted further by an accelerated push by the TV OEMs to reduce the number of LEDs used per TV (although the individual chip area has expanded).

As a result, capacity utilization levels at both the Korean and Taiwanese LED makers have hovered in the mid-50s or below in both 2Q11 and 3Q11. Additionally, many of these companies do not anticipate a recovery in the LED BLU market until 2H12 at the earliest, with some pointing to 2013. As a result, we look for MOCVD demand out of Taiwan and Korea to decline 40% and 30% y/y, respectively, in 2012.

Predominantly China Backlog Implies Limited Visibility

Although Aixtron's backlog was relatively solid exiting 3Q11, approximately 70% of the backlog came from Chinese players. Given the substantial amount of uncertainty in this region, driven by financing constraints, extreme demand weakness, yield issues, and likely industry consolidation, we believe the "soundness" of the backlog and the level of visibility it provides to 4Q11 and beyond is still an area of concern.

In addition:

- China Market Likely to See Substantial Consolidation Next Year
- Used Tool Market Is Likely to Intensify ASP Pressure

See LED overview for details.

AIXG – Our View

Factoring in our expectations for: 1) substantial consolidation in the China LED market in 2012 and beyond; 2) industry overcapacity pressuring utilization levels for at least several more quarters; and 3) general lighting LED demand expanding at a gradual rate, we expect a multi-year downcycle in the MOCVD tool space. However, assuming shares find valuation support at 1-1.5x book (similar to semi equipment shares during cyclical downturns), then we see Aixtron shares as likely range-bound in the coming months. We do not recommend investors re-engage with the names until either visibility improves to an absolute order bottom or further downside is very limited (i.e., shares trade at 1x book).

VEECO INSTRUMENTS INC. (VECO; 2-EQUAL WEIGHT/2-NEU); PRICE TARGET $25

VECO

Stock Rating
2-EQUAL WEIGHT

Sector View
2-NEUTRAL

Price Target
USD 25.00

Price (08-Nov-2011)
USD 28.67

Potential Upside/Downside
-13%

Veeco Instruments Inc.(VECO): Quarterly and Annual EPS (USD)

	2010	2011			2012			Change y/y	
FY Dec	Actual	Old	New	Cons	Old	New	Cons	2011	2012
Q1	0.49A	1.33A	1.33A	1.33A	0.36E	0.36E	0.45E	171%	-73%
Q2	1.01A	1.34A	1.34A	1.34A	0.34E	0.34E	0.41E	33%	-75%
Q3	1.46A	1.33A	1.33A	1.33A	0.49E	0.49E	0.53E	-9%	-63%
Q4	1.62A	0.67E	0.67E	0.72E	0.51E	0.51E	0.70E	-59%	-24%
Year	4.58A	4.67E	4.67E	4.66E	1.70E	1.70E	2.05E	2%	-64%
P/E	6.3		6.1			16.9			

Source: Barclays Capital
Consensus numbers are from Thomson Reuters

COMPANY SNAPSHOT

Veeco Instruments Display & Lighting

Income statement ($mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	993	977	605	636	-13.8%
EBITDA	298	278	98	113	-27.5%
EBIT	285	261	78	93	-31.1%
Pre-tax income	279	259	71	87	-32.2%
Net income	266	202	51	63	-38.3%
Reported EPS ($)	4.58	4.67	1.70	1.90	-25.4%
Diluted shares (m)	43	41	40	41	-0.8%
Dividend per share ($)	-	-	-	-	NA

Margin and return data (%)					Average
EBITDA margin	30.0	28.4	16.1	17.8	23.1
EBIT margin	28.7	26.7	12.8	14.7	20.7
Pre-tax margin	28.1	26.5	11.8	13.7	20.0
Net margin	26.8	20.6	8.5	9.9	16.4
ROIC	40.1	27.3	8.1	9.1 %	0.2
ROA	30.3	20.9	6.5	7.5 %	16.3
ROE	47.4	29.4	8.1	9.1 %	23.5

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	1,096	726	748	815	-9.4%
Intangible fixed assets	52	56	56	56	2.7%
Cash and equivalents	715	387	404	435	-15.3%
Total assets	1,148	783	804	871	-8.8%
Short and long-term debt	104	3	3	3	-70.3%
Other long-term liabilities	282	171	144	153	-18.4%
Total liabilities	386	174	146	155	-26.1%
Net debt/(funds)	(611)	(384)	(401)	(433)	NA
Shareholders' equity	763	609	658	716	-2.1%
Change in working capital	(8)	16	4	(2)	NA
Operating cash flow	194	151	65	79	-25.8%
Capital expenditure	214	(90)	(48)	(48)	NA
Free cash flow	408	61	17	31	-57.5%

Valuation and leverage metrics					Average
P/E (x)	6.3	6.1	16.9	15.1	11.1
EV/EBITDA (x)	2.1	3.1	9.5	8.1	5.7
FCF yield (%)	33.5	5.2	1.5	2.6	0.1
Price/sales (x)	1.2	1.2	1.9	1.9	1.5
Price/BV (x)	1.6	1.9	1.7	1.7	1.7
Dividend yield (%)	-	-	-	-	-
Total debt/capital (%)	0.1	0.0	0.0	0.0	0.0

Selected operating metrics					
MOCVD Tool Shipments	798	700	400	440	

Source: Company data, Barclays Capital; all estimates are based on Calendar Year

Stock Rating	2-EQUAL WEIGHT
Sector View	2-NEUTRAL
Price (09-Nov-2011)	28.67
Price Target	25.00
Ticker	VECO

Investment case

Our $25 price target is based on the midpoint of 1-1.5x book value of ~$20 per share.

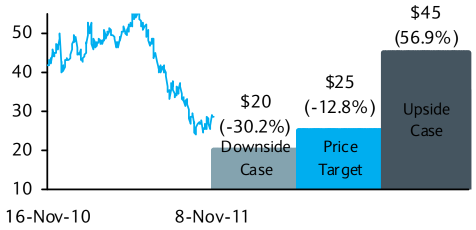
Upside case 45.00

Our upside case of $45 is based upon 10x our upside CY12 EPS of $4.67, which assumes a flattish MOCVD market with 2011.

Downside case 20.00

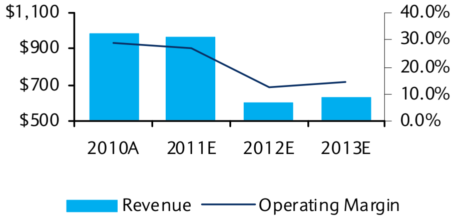
Our downside case of $20 is based on ~1x book value per share.

Upside/downside scenarios



Source: FactSet

Revenue ($mn) and Operating Margin



Note: FY end Dec.

Veeco – Investment Thesis

We believe sentiment for Veeco will continue to be pressured by structural issues (i.e., LED industry overcapacity and a likely extended equipment demand downturn), partially offset by company-specific positives (market share gains in MOCVD, potential near-term ramp in HDD orders, strong net cash position). Overall, we believe VECO shares will remain range-bound until visibility improves to a sustainable order recovery and/or a reversal in market share trends. Our rating is 2-Equal Weight/2-Neutral and we maintain our $25 price target based on the midpoint of 1-1.5x book value of roughly $20 per share.

Investment Positives

Margin Structure Remains Flexible

While management's Dec Q guidance at the low end reflects a 35% q/q sales decline, gross margins are still anticipated to be 44+%. Additionally, management is proactively managing the cost structure and lowering opex by $5-7mn in anticipation of the slowdown. Veeco's quarterly earnings breakeven is now at ~$100mn vs. earlier levels of $120-150mn. Net net, we believe that Veeco's push toward flexible manufacturing has positioned it well for inherent cyclicality in the industry.

Clear Evidence Maxbright Traction Accelerating

Veeco's Sep Q results highlighted the traction with their cluster Maxbright tool. Maxbrights accounted for almost 50% of Veeco's MOCVD revenues, and we estimate the company revenued ~13 Maxbrights (or ~52 chambers) in 3Q, including the nine Maxbrights shipped in 1H11 and an additional 4 shipped during the quarter. And given expectations for the revenue mix to shift gradually toward Maxbrights going forward, we see this as supporting our view of Veeco maintaining low 50s market share in 2012-13.

Data Storage May Rebound in Dec/March Q

Veeco reported significant declines in both revenues and bookings for Data Storage, reflecting regulatory uncertainty on the mergers and acquisition activity in the industry as well as PC weakness. However, as the M&A issues get resolved and given the flooding impact to the capacity of several HDD players, we anticipate some rebound here over the next 1-2 quarters.

Investment Risks

We see risks for Veco as similar to those we have outlined for Aixtron;

- We See Limited Reasons for LED Makers to Add Capacity in 2012
- Predominantly China Backlog Implies Limited Visibility
- China Market Likely to See Substantial Consolidation Next Year
- Used Tool Market Is Likely to Intensify ASP Pressure

Please refer to the AIXG risks section and LED overview for details.

VECO – Our View

Assuming shares find valuation support at 1-1.5x book (similar to semi equipment shares during cyclical downturns), then we see Veeco shares as likely range-bound in the coming months. We do not recommend investors re-engage with the stock until either visibility improves to an absolute order bottom or further downside is very limited (i.e., shares trade at 1x book). This said, we could see near-term upside driven by expectations for HDD bookings growth due to Western Digital's impacted capacity.

SEMILEDS CORP. (LEDS; 2-EQUAL WEIGHT/2-NEU); PRICE TARGET $5

LEDS

Stock Rating
2-EQUAL WEIGHT

Sector View
2-NEUTRAL

Price Target
USD 5.00

Price (08-Nov-2011)
USD 3.82

Potential Upside/Downside
+31%

SemiLEDs Corp.(LEDS): Quarterly and Annual EPS (USD)

	2010	2011			2012			Change y/y	
FY Aug	Actual	Old	New	Cons	Old	New	Cons	2011	2012
Q1	N/A	0.12A	0.12A	N/A	-0.28E	-0.28E	-0.13E	N/A	-333%
Q2	N/A	-0.03A	-0.03A	-0.03A	-0.23E	-0.23E	-0.09E	N/A	-667%
Q3	N/A	-0.12A	-0.12A	-0.16A	-0.16E	-0.16E	-0.07E	N/A	-33%
Q4	N/A	-0.49A	-0.49A	-0.49A	-0.16E	-0.16E	-0.01E	N/A	67%
Year	N/A	-0.60E	-0.60E	-0.79A	-0.83E	-0.83E	-0.27E	N/A	-38%
P/E	N/A		N/A			N/A			

Source: Barclays Capital
Consensus numbers are from Thomson Reuters

COMPANY SNAPSHOT

SemiLEDS Display & Lighting

Income statement ($mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	43	27	43	77	-29.1%
EBITDA	20	(17)	(4)	15	NA
EBIT	15	(26)	(17)	(0)	NA
Pre-tax income	14	(30)	(17)	2	-45.7%
Net income	13	(29)	(17)	2	-77.8%
Reported EPS ($)	$ 0.49	(0.98)	(0.55)	0.15	284.2%
Diluted shares (m)	22	27	27	28	NA
Dividend per share ($)	-	-	-	-	NA

Margin and return data (%)					Average
EBITDA margin	46.1	-64.2	-9.0	19.7	-1.9
EBIT margin	34.0	-98.3	-38.4	-0.3	-25.7
Pre-tax margin	32.2	-111.3	-40.3	3.2	-29.1
Net margin	31.4	-108.2	-39.5	2.9	-28.4
ROIC	9.2	-11.6	-1.5	-1.5	- 0.0
ROA	8.7	-11.1	-1.5	-1.5	-1.3
ROE	9.8	-12.3	-1.6	-1.6	-1.4

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	190	152	140	157	-75.0%
Intangible fixed assets	0	3	3	3	394.8%
Cash and equivalents	103	62	50	57	16.0%
Total assets	190	155	143	160	-65.1%
Short and long-term debt	10	8	8	8	-1.3%
Other long-term liabilities	9	5	6	10	24.7%
Total liabilities	19	13	14	18	NA
Net debt/(funds)	(92)	(54)	(42)	(49)	NA
Shareholders' equity	171	141	129	143	-60.2%
Change in working capital	9	(3)	4	11	28.2%
Operating cash flow	8	(14)	(2)	19	NA
Capital expenditure	(20)	(16)	(9)	(11)	NA
Free cash flow	(12)	(30)	(10)	8	NA

Valuation and leverage metrics					Average
P/E (x)	7.4	- 3.7	- 6.6	24.9	5.5
EV/EBITDA (x)	- 0.8	- 1.7	- 3.5	- 269.5	- 68.9
FCF yield (%)	-15.1	-30.0	-10.2	7.5	- 0.1
Price/sales (x)	1.9	3.7	2.3	1.3	2.3
Price/BV (x)	0.5	0.7	0.8	0.7	0.7
Dividend yield (%)	-	-	-	-	-
Total debt/capital (%)	0.1	0.1	0.1	0.1	0.1

Selected operating metrics (mn units)					
LCD TV Shipments	192	205	230	252	
Total PC Shipments	340	352	370	387	

Source: Company data, Barclays Capital; all estimates are based on Calendar Year

Stock Rating	2-EQUAL WEIGHT
Sector View	2-NEUTRAL
Price (08-Nov-2011)	3.67
Price Target	5.00
Ticker	LEDS

Investment case

Our $5 price target is based on 1x book value per share of ~$5 exiting CY11.

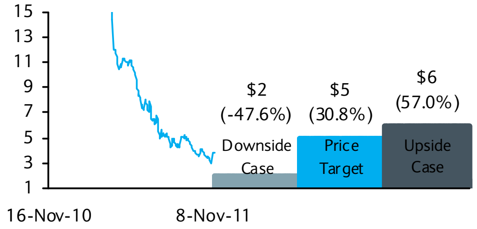
Upside case **6.00**

Our upside case of $6 is based upon 12x our upside CY12 EPS of $0.50, which assumes an acceleration in China/Taiwan lighting demand and 30+% gross margins.

Downside case **2.00**

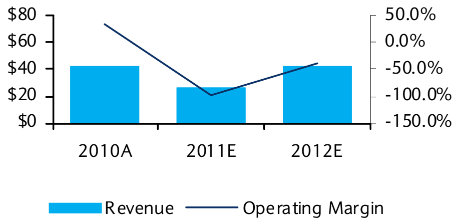
Our downside case of $2 is based on ~1x expected trough net cash per share of ~$2.

Upside/downside scenarios



Source: FactSet

Revenue ($mn) and Operating Margin



Note: FY end Aug.

SemiLEDS – Investment Thesis

Since SemiLEDs' public debut in December 2010, the company has suffered from a roster of missed expectations on its quarterly sales and margin targets. As the company's gross margin has materially decreased in recent quarters to negative territory, it is evident to us that SemiLEDs has suffered from its inability to gain scale and drive costs out of its business in the face of rapid pricing declines and sluggish outdoor lighting demand. We therefore believe that share performance will depend on management's ability to drive costs out of its business concurrently with a recovery in end-market demand. Our rating is 2-Equal Weight/2-Neutral with a $5 price target, which equates to approximately 1x estimated book value per share of $5 exiting CY11.

Investment Positives

SemiLEDS' Chip Quality Is Still Near the Top

Although scale and cost reductions remain concerns, SemiLEDs does maintain quality leadership, remaining one of only a handful of suppliers capable of manufacturing 100+ lm/W LEDs in mass production.

Unlike Most Competitors, SemiLEDs Is Almost Entirely Leveraged to General Lighting

Unlike many of its LED competitors, particularly in Taiwan and Korea, SemiLEDs has no exposure to the now-commoditized and highly cyclical demand for backlighting-grade LEDs. In fact, over 90% of SemiLEDs' sales stem from general lighting, including roughly 40% for street lighting (primarily China), 38% for solid state/interior lighting, and 14% for specialty lighting (i.e., architectural lighting, mining lights).

China SemiLEDS JV Gives the Company Direct Access to the China Market

Although other large-scale LED makers have been able to make inroads into the China market, LEDS' China JV (where ownership is split with several government-related entities) positions SemiLEDS' products as "domestically manufactured" and allows for better access to Chinese municipal LED lighting program roll-outs, once they begin to accelerate.

Investment Risks

Profitability Remains Elusive

With LEDS' gross margin pressured by continued inventory work-down and fab utilization levels of around 40%, and operating margin further pressured by litigation costs and ramping R&D to support the conversion to 4" production, we do not anticipate the company returning to profitability until roughly 2013.

Reliance on China/Taiwan Outdoor Lighting Demand Is a Double-Edged Sword

On the one hand, SemiLEDS' leverage primarily to outdoor lighting demand allows the company to compete in a quality-driven, less commoditized pocket of the LED market. On the other hand, the reliance primarily on Chinese and Taiwanese LED outdoor lighting roll-outs mean that the current sluggish demand in these markets impacts SemiLEDs disproportionately. Although the company is now attempting to diversify into indoor lighting applications, the longer-tem implications of this strategy are still uncertain.

Cash Burn Continues

SemiLEDS' cash balance declined by approximately $10 million exiting the August quarter as a function of the company's operating losses and capex investment to support 4" production, driving net cash per share to around $2.90. Based on the guidance provided for November quarter, we see the cash burn continuing, as we model net cash per share at around $2.30 exiting the November quarter, before bottoming out at $1.60-2.00 in 2012.

LEDS – Our View

Overall, we do not anticipate a meaningful or sustainable share recovery until SemiLEDS returns to profitability and investors gain confidence in a stabilizing cash balance and a pathway to growth. In the meantime, we see shares as likely range-bound, with potential downside to approximately $2+, which would equate to 1-1.5x trough net cash per share.

ENERGY GENERATION: SOLAR

Key Trends

Expanding Global Deployments

Our forecast: Global CAGR of 31% over the next four years.

While historically relegated to specific markets such as Germany and Italy, the solar industry should benefit from a multi-year expansion in global deployments as countries such as the United States, China, and India increase their investment in renewable energy. Overall, our global solar estimates call for a CAGR of 31.1% over the next four years as investment increases in these three countries offsets anticipated stabilization in Europe. We recognize that near-term demand trends are likely to remain muted as the industry digests clear over-capacity in the food chain while wrestling with issues around declining regulatory incentives.

Lower Costs Help Improve Value Proposition

Solar's ultimate value proposition is its ability to generate electricity at a comparable cost to traditional means, thereby making it a compelling alternative. The steep reduction in module prices over the last year from $2.00 to around, or even below, $1.10 today has enabled the industry to get closer to its target of grid parity. While we recognize a number of factors that influence the ultimate price of solar energy (incentives and efficiencies), ultimately lower systems costs should help improve the technology's value proposition as a cost-effective alternative to generating power.

Rationalization Should Help Normalize Supply Chain

Overall, the solar industry continues to face headwinds from overcapacity. Simply put, there are too many vendors — some of which receive too much cheap money — providing product into the market across the value chain. As we have already begun to witness, consolidation and more likely rationalization is likely to continue driving economically unsustainable businesses out of the industry. Over the long term, we view this as a positive trend as it should allow the supply chain to return to normalized levels in order to realistically support the demand environment.

Key Challenges

Overcapacity is a Headwind

We believe that overcapacity is likely to remain a headwind for at least the near term. Declining demand in key markets (e.g., Europe, and more specifically, Germany, due to diminishing government support) needs to be offset by growth in increasing energy demand areas such as the United States, China, and India. The pace of that trade-off is likely to be influenced by a number of factors, including regulatory priorities and systems pricing. Moreover, as recent polysilicon prices continue to trend materially lower, we believe high-cost manufacturers will likely need to depart in order to reduce overcapacity in the market. The timing of this reduction of capacity, however, remains uncertain.

Geographic Shift in Demand Alters Market Dynamics

When it comes to solar, the US, China, and India offer strong growth opportunities.

The shifting demand landscape is likely to alter market dynamics for the solar industry. Industry growth is now expected to come from "emerging" markets such as the United States, China, and India while more mature markets such as Germany reduce demand. Given the different support structures in place within each of these markets, vendors may find the need to adjust to different market dynamics in the coming years vs. prior years. For example, the United States does not provide a national feed-in tariff, and vendors effectively must work on a state-by-state, even local, level, making procurement of necessary approval more challenging. In China, international vendors may have increased difficulty competing with domestic suppliers given regional favoritism to home-grown companies. In our view, the shift in regional demand trends is likely to alter industry dynamics, which could ultimately impact who succeeds/fails in the market.

Background

What Is Photovoltaic Solar Energy?

Photovoltaic technology is the conversion of solar radiation to electricity using semiconductor technology.

Photovoltaic (Photo = light and voltaic = electricity) technology is used to convert solar radiation to electricity, utilizing specific semiconductor technology. The solar cell generates electric energy from light when solar radiation photons are absorbed by a semiconducting material (usually silicon) and electrons are shaken loose from their atoms. Separation of the charge carriers to a conductive contact transmits the electricity. Ultimately, the concentration of sunlight, panel array, temperature, and shade determine the amount of electricity that is generated.

A Brief History

PV installation growth has been driven by a mix of political, economic, and practical factors.

Solar photovoltaic (PV) technology has demonstrated that (with the appropriate regulatory framework in place) it can scale and offer improved cost metrics for electricity delivery. In general, the cost of electricity provided from PV systems is still comparatively higher than traditional means of energy generation. However, declining systems costs should enable grid parity to increasingly emerge in various geographies over the next few years.

Our forecast: The solar power market will grow at a 31.1% CAGR from roughly 40 GW of global installed capacity in 2010 to roughly 157 GW in 2015 driven by an increase in the select countries highlighted earlier and an overall increase in European and Asian Pacific demand.

Incentives for PV systems are often driven by a mix of political, economical, and practical factors. These include the desire to reduce greenhouse gas emissions, limit exposure to raw materials cost (e.g., oil), reduce distribution costs, achieve energy independence, and improve energy security among others. In our view, solar PV systems are evolving into a mature, sustainable, and potentially attractive technology as it gains interest with utilities and governments alike. Despite some overall concerns (which we will address later in this section) we believe PV-generated power has proved to be an absorbable technology that can gain share as pricing improves over the long term. PV technology has developed significantly as efficiencies of solar cells are improving and input costs are decreasing. By our estimates, the solar power market will grow at a 31.1% CAGR from roughly 40 GW of global installed capacity in 2010 to roughly 157 GW in 2015 driven by an increase in overall European demand and Asian-Pacific demand. However, it is clear that continued support from federal and local governments will be needed in order to further drive the growth of global capacity and annual installations. Near term demand will primarily be driven by North America and somewhat by China as demand from the market's largest region (Germany) declines.

While PV technology has been around for some time, growth in the industry really began to take off in the last few decades and has accelerated in the current decade primarily due to a number of government initiatives in various markets globally.

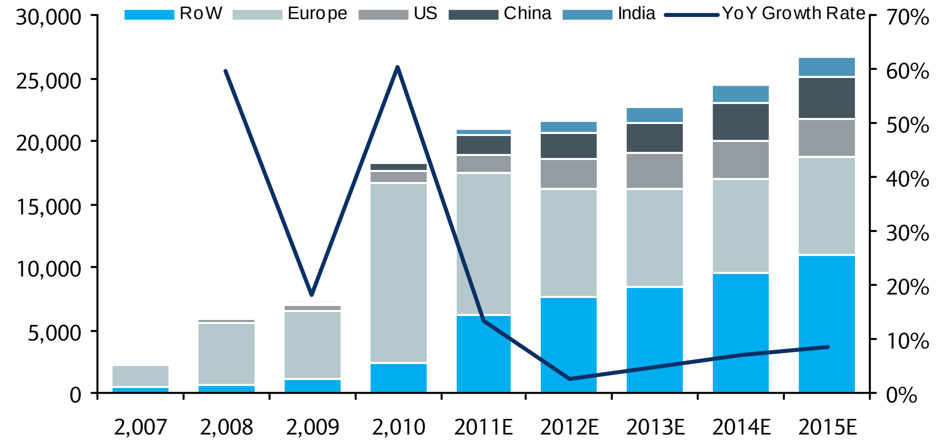
Figure 114: The Evolution of the Solar Industry

Time Period	Events/Catalysts	Notes	Winners
1980 – 2000	- Demonstration Projects	Japan, US and Europe explore projects without any incentives.	- Technology Entrepreneurs - R&D Labs
2003 – 2005	- FiT in Japan - FiT in Germany	Initial installations across end users driven by incentives. Europe hasn't yet emerged.	- Green parties develop in the EU - Japanese and Germans are first major entrants into the market.
2007 – 2010	Bubble FiT in Spain Bubble FiT in Italy	- Local OEMs unable to manage the growth leading to the development of the Chinese OEM market. - European manufacturing machinery emerges	- Financial investors - Land/Property speculators Chinese OEMs
2011	Second step down in pricing. Grid parity begins to emerge in select regions.	- China dominates the C-Si technology - European markets delocalizing yielding capacity grown in absence of profits.	- Industrially mature global OEMs - Distributers
2012E	Levelized cost of energy versus internal rate of return	- Distributed generation forces utilities to reconsider power users as clients	- Rate payers - Competent developers
2013-20E	Renewable Targets	Adoption cycle accelerates given an improved global economy as countries work to meet 2020 targets.	- Survivors of the consolidation and rationalization period

Source: Yingli Solar, Barclays Capital Research

The charts below summarize the growth trajectory of the solar industry based on geography. It is important to understand that we are illustrating generative capacity as opposed to manufacturing capacity. Total installed capacity is highest in Europe and will likely continue that way as a result of its EU 2020 Directive, which sets renewable targets for the European Union by 2020, prompting countries to be aggressive with increasing renewable energy generation. Annual installations are likely to grow the fastest in Asia as most of the market is just beginning adoption and several countries have long-term renewable targets in place.

Figure 115: Annual Capacity Installation Estimates (MW)



Source: Barclays Capital Estimates

Type of Solar Installations

PV systems can be installed in individual houses, public buildings, offices (public and private); utility grade systems are designed to provide energy to a specific geographic region. Types of PV systems include:

- **Grid-Connected Systems:** A grid-connected system is a PV installation that is connected to an electricity grid. If surplus power is generated through this type of system, it is put back into the electricity grid.
- **Utility and Industrial Scale Systems:** Essentially these types of PV installations are large power plants with the capacity to provide a significant amount of power for a specific region and can be either ground-mounted or rooftop installed systems.
- **Residential and Commercial Systems:** Residential and commercial PV systems are installed on rooftops. These systems are often connected to the grid and any energy not used by the building/house is sold back to the grid. The power generated by these systems is usually DC and thus requires an inverter to convert it to AC, which is what is used by most households.
- **Off-Grid, Stand-Alone and Hybrid Systems:** There are also a number of applications for PV systems that do not utilize a connection to the electricity grid. They can be deployed as a stand-alone system (providing energy in rural areas where there may not be grid connectivity, or for various specific applications such as cellular towers) or a hybrid (using the energy generated from solar energy when available and traditional means at other times).

In our view, the key growth opportunity for the PV markets is the utility and industrial grade and commercial/residential market.

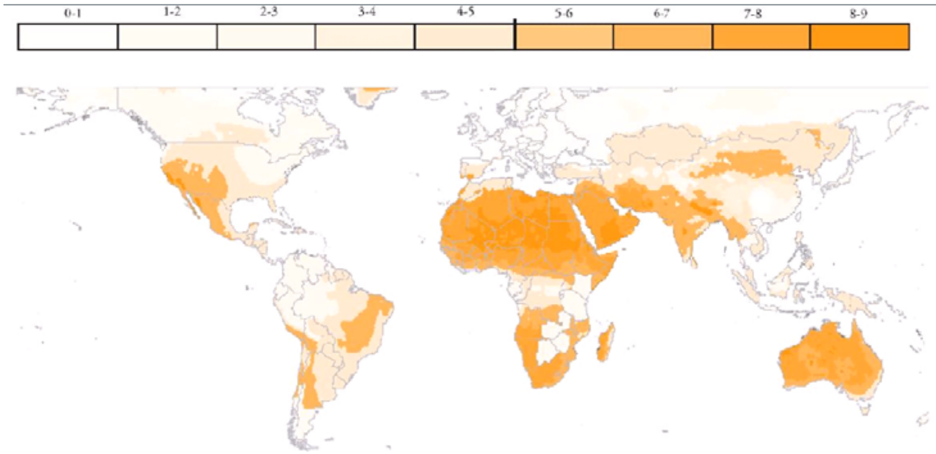
Geography Matters

Because the amount of energy generated is largely dependent on how long the sun shines, geographic placement is clearly a factor that defines opportunity.

Although incentive structures, manufacturing locations, power generation costs, and delivery are all important variables impacting the business case of a solar installation, an integral but sometimes overlooked factor is geography. NASA defines solar irradiance as the amount of light energy from one energy source hitting a square meter of another each second. For our purposes, it is the output of light energy from the entire disk of the Sun, measured from the Earth.

The map below illustrates that solar resources in Australia, Mexico, the west coast of the United States, the Middle East, and southern and northern Africa are strong. Parts of Latin America, Southeast Asia, and China have strong potential as well. The scale below is read from left to right, increasing in solar irradiation as we move rightward.

Figure 116: Solar Irradiation Map



Source: World Resources Institute

According to the EPIA, there is more than enough solar irradiation to meet the world's energy demands.

There is more than enough solar irradiation available on Earth to meet the world's energy demands. According to the European Photovoltaic Industry Association (EPIA), there is enough total energy reaching the Earth's surface to satisfy 10,000x the global energy needs as each square meter of land on Earth is exposed to enough sunlight to generate 1,700 kWh of energy considering today's technology. It is no coincidence then that a sizeable chunk of demand in the United States comes from western states where temperatures are warmer and sunlight lasts longer. The same can be said about parts of Europe, with the exception of Germany, which hosts similar irradiation levels to Alaska.

Capturing that energy, and more importantly, delivering it, is the challenge.

Simply put, more power can be generated in areas where there is more sun. The sub-tropical areas of the world offer some of the best locations for solar farms and power generation. We recognize, however, that with fiscal budget constraints, risk-averse utilities, the current economic climate, and overall installation and delivery costs, the question isn't simply a matter of going solar, but rather addressing a number of challenges in order to ensure that solar is a viable energy-generating technology. In other words, it is not just about *if* you can generate enough energy but how and at what cost you can provide that energy.

Overall penetration for renewables is relatively low and only represents a fraction of energy consumption. Renewables represented 8% of the entire U.S. 2010 energy mix with hydroelectric and biomass making up a combined 84%. Solar represented 1% of that value.

While we expect the contribution of renewables to increase, we believe an appropriate level of perspective is needed in order to understand solar's overall contribution to global energy.

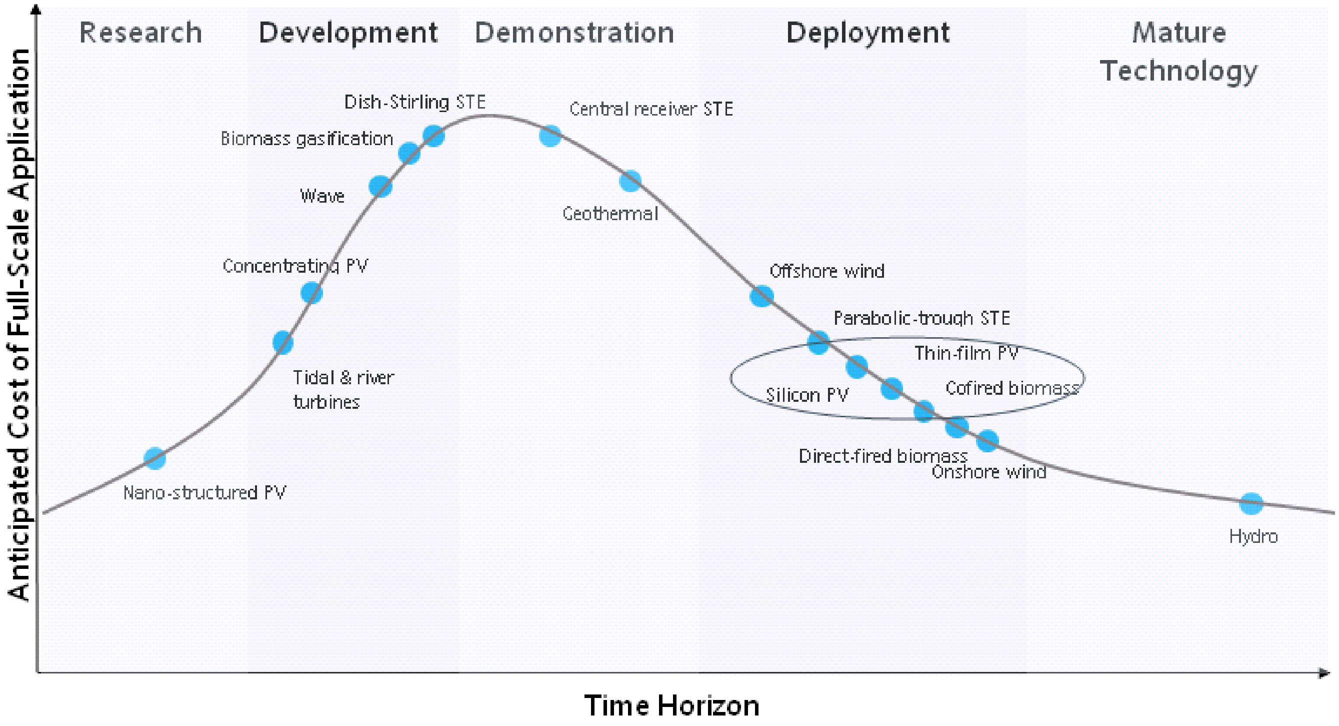
The PV market has a mature set of technologies that are at the forefront of the industry.

Solar Technologies

The solar cell industry has four generations of development:

- The first generation consists of silicon wafer-based solar cells, the dominant technology in commercial electricity production.
- The second generation is based on thin-film technologies. Here, amorphous silicon (a-Si) and Cadmium telluride (CdTe) are the most advanced technology. Copper indium gallium selenide (CIGS) is a relatively new semiconductor material primarily in the test phase as we have yet to see substantially commercial grade deployment of the technology. Thin-film has the advantages of lower cost per watt and flexible installation, but the disadvantage of reduced efficiency relative to wafer-based silicon.
- Technologies under development in third-generation PV include nanocrystal (quantum dot), photo-electrochemical, and polymer solar cells. Fundamentally, they do not rely on the traditional p-n junction, the building blocks of most semiconductor devices where electron action takes place, to separate photo-generated charge carriers.
- Fourth-generation PV involves the mixture of polymers with nano particles to make multispectrum-layered cells, which can be stacked to make more efficient and cheaper solar cells.

Figure 117: Alternative Technology Life Cycle



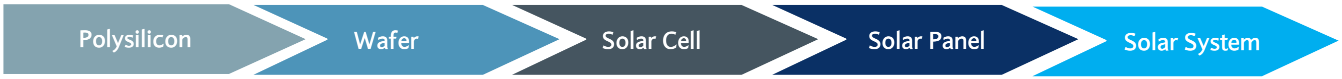
Source: Electric Power Research Institute, Barclays Capital

Crystalline Technologies

Crystalline technologies represent the largest solar cell technology, at approximately 85-90% of the total market demand.

Crystalline silicon (c-Si) is the most common light-absorbing semiconductor for solar cells despite it being a somewhat poor absorber of light and relatively thick as compared to its thin-film counterpart and represents approximately 85-90% of the solar cell sales to date in 2011. According to the National Renewable Energy Laboratory, annual production of Si-based PV in 2011 reached more than 15 GW. Efficiency yields with crystalline solar cells are 15-17% using process technologies from the greater microelectronics industry, according to Solarbuzz.

Figure 118: Crystalline Manufacturing Process



Polysilicon	Wafer	Solar Cell	Solar Panel	Solar System
Solar grade polysilicon is manufactured using primarily the Siemens Process or the Fluidized Bed Reactor Process.	Polysilicon is melted to form solar ingots which are then finely sliced into solar wafers.	The solar cell converts solar radiation into electricity. Labs usually analyze potential efficiencies using solar cells.	Solar cells are weaved together to form a solar panel. The marketplace offers ground-mount panels and rooftop panels. Solar panels can also be referred to as solar modules.	Installers of solar systems take separate modules and link them all together to develop a solar farm/solar system.

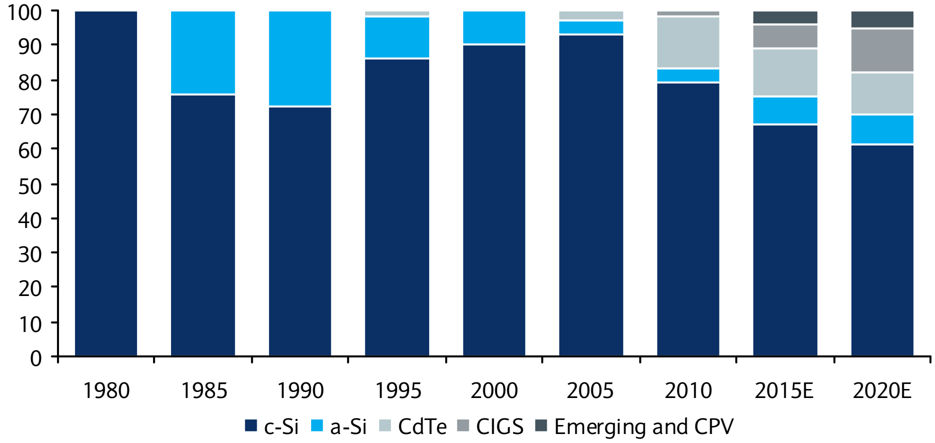
Source: Barclays Capital

There are two types of crystalline technologies currently used in the industry, monocrystalline and multicrystalline.

- **Monocrystalline cells** are cut from a chunk of silicon that has been grown from a single crystal and are generally more expensive due to their higher efficiency qualities as compared to multicrystalline cells.
- **Multicrystalline cells**, also referred to as polycrystalline cells, are cut from multifaceted silicon crystals. These cells require more surface area as they are less efficient at converting sunlight to energy.

The major advantage to crystalline technologies is that there are several manufacturing processes that are high volume and scalable. The major disadvantage is that the systems cost for crystalline technologies is heavily dependent on polysilicon pricing which has been a cause for concern for module providers given pricing declines and shrinking margins. The flip side of course is that the attractiveness of the technology improves with lower cost systems.

Figure 119: Evolution of Technology Market Share and Future Trends (%)



Source: EPIA

Thin-Film Technologies

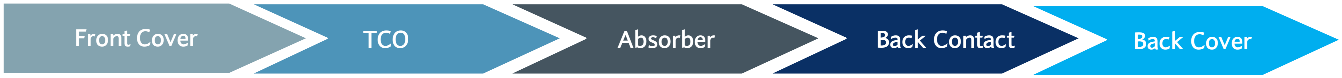
Though only about 10-15% of the market, thin-film technologies provide a lower-cost alternative to crystalline.

Historically, higher silicon wafer costs led the industry to consider less expensive materials to manufacture solar cells. Representing approximately 10-15% of the market today and appropriately named "thin film" technology, the 1-micron-thick cells are significantly thinner than crystalline cells, reducing material and installation costs. The technology is a relatively new next-generation solar PV technology that has the potential to grow faster than conventional solar technology, given improved efficiencies. Thin-film solar panels are manufactured by depositing a layer of semiconductor/non-semiconductor material on glass or another flexible substrate.

There are three widely adopted thin-film technologies currently in the market:

- Cadmium Telluride (CdTe),
- Copper Indium Gallium De-Selenide (CIGS), and
- Amorphous Silicon (a-Si).

Figure 120: Thin-Film Manufacturing Process



Front Cover	TCO	Absorber	Back Contact	Back Cover
A large sheet of substrate is usually produced typically made of glass or other materials such as plastic, flexible steel or aluminum.	The front cover substrate is usually coated with a transparent conducting layer (TCO).	The semiconductor material (1 2% of crystalline cells) is deposited onto the substrate. There are various techniques that can be used in this step. Chemical and physical vapor are the most common.	Metallic contact strips are applied using a laser scribing or traditional screen-printing techniques onto the back cover.	The entire module is enclosed in a glass-polymer casing.

Source: EPIA, Barclays Capital

Cadmium Telluride (CdTe)

Known throughout the industry as First Solar's go-to technology, cadmium telluride (CdTe) is one of the more common thin-film technologies in use today. CdTe is a stable and inert semiconductor made from cadmium and telluride, by-products of mining copper and zinc production. CdTe is a direct bandgap semiconductor and is able to more efficiently convert solar energy into electricity than indirect bandgap semiconductors in addition to only using 1-2% of the semiconductor material used in conventional silicon-based cells. CdTe modules are more efficient in absorbing solar energy even in low and diffuse light situations (dawn/dusk/cloudy) than traditional cells despite a lower average conversion efficiency of roughly 11.7% up from 9% in 2005. dTe has been recognized by the National Renewable Energy Laboratory to have the potential for achieving the lowest production costs among thin-film technologies.

One of the long-term concerns about using CdTe relates to elemental Tellurium (Te) as it is as rare as some of Earth's precious metals. Elemental Cadmium, on the other hand, and some of its compounds, are considered hazardous. The risks of exposure from CdTe are not considered as serious as those from elemental Cadmium. The risks can be mitigated by the encapsulation of the modules.

Copper Indium Gallium De-Selenide (CIGS)

CIGS proves to be the most effective in terms of efficiency and cost improvement, according to Solarbuzz. However, large-scale volume production has been challenging due to the complexity of layering and mixing the different CIGS components to make cells. There are currently four techniques for the deposition of CIGS material onto a cell:

- **Electroplating:** An electrically charged cell is dipped in an oppositely charged CIGS solution which often results in a potentially uneven deposition that can lead to lower efficiencies and higher material loss. The major upside to this technology is that it is a proven process technology on an industrial scale and has been used for other applications.

- **Nano-particle printing:** An ink solution with nano-particles of CIGS composites is printed onto the cell using an ink jet printer–like technology. The challenge in this process is formulating and constantly maintaining the right ink mix. Nano-particle printing can also result in an uneven deposition of CIGS materials, resulting in lower efficiency.

- **Thermal evaporation:** In this process, base materials are vaporized and gradually deposited onto the cell substrate. This is the most common process used for lab-level CIGS cell manufacturing. Uniform deposition is difficult for larger substrates, making scaling a challenge.

- **Sputtering:** Sputtering is a process whereby atoms are ejected from a solid target material due to the bombardment by energetic particles. This technique is one of the more technically challenging processes as it involves high temperatures and a vacuum environment.

Amorphous Silicon (a-Si)

Commonly seen on solar-powered calculators, a-Si solar cells are composed of layers of amorphous silicon that are deposited as light-absorbing materials on rigid or flexible substrates instead of traditional crystalline silicon layers. The major disadvantage with this technology is that is holds the lowest efficiency of all thin-film cells at around 4-8%. Employing a-Si thin film does present some challenges. Instability is arguably the biggest obstacle as the mechanism of degradation, known as the Staebler-Wronski effect, causes the conversion efficiency to decrease considerably during initial exposure to sunlight.

Figure 121: Commercial Module Efficiency

Technology	Thin Film					Cystalline Silicon		CPV
	a-Si	CdTe	CIGS	a-Si/µc-Si	Dye s. cells	Mono	Multi	III-V Multi-Junction
Cell Efficiency	4-8%	10-11%	7-12%	7-9%	2-4%	16-22%	14-18%	30-38%
Module Efficiency						13-19%	11-15%	~25%
Area needed per KW (Modules)	~15 m^2	~10 m^2	~10 m^2	~12 m^2		~7 m^2	~8 m^2	

Source: EPIA

Solar Cell Efficiency Ratings

Solar cell efficiency – i.e., how much sunlight is converted to electricity – is a key differentiator among cell manufacturers and module vendors.

In order to compete in the marketplace today, there are two important things that any purchaser of solar cells will consider. The first is undoubtedly price, but the second is the efficiency level associated with the solar cell. Many companies are currently in the midst of developing more efficient solar cells that can eventually be transitioned into high volume production. Generally, the most efficient cells are not always the most economically viable. There is a range of 6% efficiency for amorphous silicon cells to 40% efficiency for multi-junction research lab cells. Somewhere in the middle, commercially available c-Si cells have efficiencies around 15%.

On average, solar module efficiencies are about two percentage points lower than cell efficiencies due to: 1) efficiency loss resulting from cell packaging and module frames, 2) efficiency loss resulting from glass absorption and 3) resistive loss resulting from conductive ribbon used as an interconnect between cells and modules. The industry is working on incorporating the use of multilayer interconnected ribbons of aluminum and copper that could potentially improve module efficiencies.

The efficiency of a solar cell actually decreases with increasing temperature.

Contrary to what one might expect, heat doesn't always result in a more efficient cell. In fact, the efficiency of a solar cell decreases with increasing temperature. The reason for this is that a higher temperature increases the conductivity of the semiconductor (one of the reasons thin-film cells, which don't use as much silicon, are less affected by heat). The higher conductivity balances out the charge in the semiconductor material reducing the magnitude of the electric field at the junction.

Below we highlight cell efficiencies and target cell efficiencies of several major manufactures in the marketplace.

Figure 122: Select Market Cell Efficiencies

Company	Technology	Current Efficiency	Target Date	Target Efficiency
First Solar	Thin-Film – CdTe	11.7%	2014	13.5-14.5%
Yingli Solar	Crystalline – Multi	16.8%	2015	17.8%
Yingli Solar	Crystalline – Mono	18.5%	2015	21%
Trina Solar	Crystalline – Multi	17.2%	2013	19.5%
Trina Solar	Crystalline – Mono	19.5%	2013	21.5%
SunPower	Crystalline	19%	NA	NA

Source: Company Reports

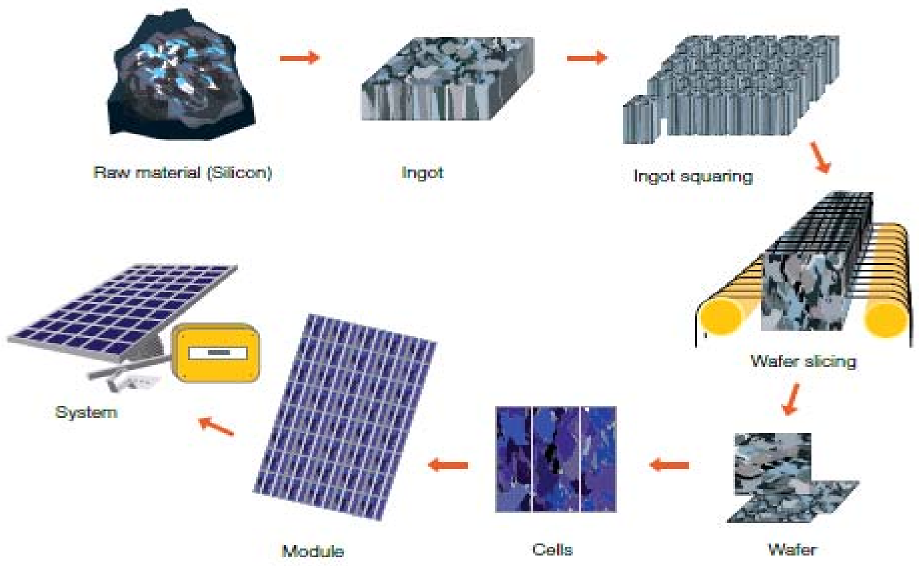
Understanding the Solar Value Chain

A Well-Defined Manufacturing Process

In our view, the maturation of the industry has enabled a well-defined manufacturing process to emerge.

Though participants in the solar industry focus on technological differentiation across the value chain in order to optimize electricity generation and lower the total systems cost, the actual manufacturing process for solar panels is fairly well defined. Additionally, we have seen a fair amount of transparency across the entire value chain in order to understand which technologies are robust and where potential improvements may be needed.

Figure 123: Manufacturing Cycle



Source: European Photovoltaic Industry Association (EPIA)

Polysilicon

In today's market, there are two types of polysilicon available: Electronic grade (EG) polysilicon, which is a high purity, more expensive silicon generally used to manufacture semiconductors; and solar grade (SG) polysilicon, which is lower quality and sells at a lower price. Prior to the robust demand growth in the solar industry, SG polysilicon was often seen as a by-product of EG polysilicon making the transition from manufacturing EG to SG relatively seamless. However, considering the strong demand we have seen over the past several years, the solar industry developed a market for SG polysilicon. This resulted in new entrants in the marketplace, primarily the Chinese companies. Polysilicon manufacturing is currently concentrated among a handful of major manufacturers that have the capability to produce both EG and SG at an attractive price.

The most common way to produce polysilicon is by way of the trichlorosilane-based Siemens process. A large number of solar manufacturers such as MEMC currently use this process to produce solar grade silicon. However, some other low-cost production methods such as fluidized bed technology, vapor-to-liquid technology, and metallurgical silicon have been tested and are in the early stages of adoption.

- **Siemens Process:** The Siemens process utilizes trichlorosilane (or silane) gas as a starting material and converts it to polysilicon through a chemical vapor deposition (CVD) process. This is the oldest and most common process used in polysilicon manufacturing offering reliability and durability, despite consuming a large amount of energy and taking a long time.

- **Fluidized Bed Reactor Process:** In this process, small seed particles are introduced and a silane/hydrogen mixture is then fed into a fluidized bed reactor. The silane then decomposes around the seed particles, increasing their average size to around 1,000 microns. The main advantages of the FBR process include lower operating temperature, higher throughput, lower energy consumption, and consistent product quality.
- **Metallurgical Silicon:** Metallurgical silicon is less pure than silicon and consequently cheaper than traditional polysilicon. Even still it is not used to manufacture polysilicon based solar cells.
- **Other Methods:** Other methods in pilot production include tube deposition technology, direct reduction, vapor to liquid deposition, and purification technology.

Solar Wafers

Following polysilicon production, the next step in the manufacturing process entails high-purity polysilicon that is melted into blocks called solar ingots. Following this, they are sliced into thin discs called solar wafers. Despite its effects on margins for producers of polysilicon, falling poly prices signal a reduction in the overall systems cost for energy providers which is incremental to reaching the coveted grid parity. Reducing solar wafer costs is an important way to reduce the overall systems cost. The three primary technological techniques adopted to reduce the cost of silicon substrates are: 1) reduce the cost of silicon crystals, 2) reduce kerf loss during silicon wafer formation, and 3) enable the use of thinner wafers.

- **Silicon Crystal Cost Reduction:** Silicon crystal formation is the first step in making wafers that are ultimately converted into solar PV cells. To improve the economics of silicon crystal production, the industry has developed technologies that are capable of increasing the size and throughput of silicon ingots.
- **Kerf Loss (Silicon Waste) Reduction:** The next step once the silicon ingots are formed is to convert these ingots into bricks that are ultimately cut into wafers. During the brick formation process, a significant amount of silicon is wasted and this is known in the industry as Kerf Loss (roughly 11kg of silicon is lost out of a total size of about 260kg during the brick formation step). New brick-cutting technologies that have the potential to significantly reduce the kerf loss are being developed.
- **Thinner Wafers:** During the final step of wafer formation, the bricks are cut into wafers. The thinner the wafer, the lower the polysilicon usage. Using thinner wafers is the most effective way to lower production costs, without sacrificing cell efficiencies. For instance, a reduction of wafer thickness from 200 microns to 120 microns is estimated to result in a 12.5% reduction in the required number of grams of silicon per watt.

Solar Cell

Very simply, a solar cell converts solar radiation to electricity. When we picture large solar panels, we are really just looking at hundreds of solar cells linked together. Three key components typically make up a solar cell. The first is the semiconductor that absorbs light and converts it into electron-hole pairs to prepare it for the semiconductor junction which separates the electrons and holes, also called the photo-generated carriers. Finally, the contacts on the front and back of the cell allows the current to flow to the external circuit. There are typically five major steps in the production of silicon solar cell, namely:

- **Etching and Polishing:** Etching removes an unusable layer on the silicon wafer after the wire-sawing process. The polishing steps removed the particles on the wafer surface.
- **Cleaning:** The polished wafer is then cleaned with DI water to remove all impurities on the surface.
- **Diffusion:** The silicon wafer produced is usually p-typed. Typically, solar cell needs an n-type layer in order to create an electric field inside the cell. An n-type dopant is usually deposited on the surface of p-type substrate through a heat diffusion process, creating a "p-n junction" between the p-type and n-type layer.
- **Anti-reflective coating:** To avoid any energy losses by reflection, an anti-reflective coating is applied to the surface of the silicon wafer. The major chemical used in this process is either silicon nitride or titanium dioxide. The layering is conducted through a plasma-enhanced chemical vapor deposition (PECVD) process.
- **Screen Printing:** A grid-like metal contact made up of "fine-fingers" is screen-printed onto the front surface through the use of silver paste. The rear side of the wafer is also formed by screen-printing a metal paste, typically aluminum. The metal contacts on the surface and rear side then act as electrodes of the solar cell, which can then be interconnected for further assembly into a solar module.

Modules/Panel

The solar module market is fragmented with low barriers to entry and relatively low value-added technology resulting in more than 400 module makers worldwide serving the key solar PV markets. Because of shrinking upstream margins as a result of falling poly prices, we believe established upstream players will travel downstream by acquiring module manufacturers and regional systems providers. This trend is likely to persist in tandem with the natural trend toward consolidation and advances downstream, in our view.

System Integrators

The final step in the solar value chain involves the system integrators, which spend time installing solar modules across a particular site. The system integration companies operate at the very end of the value chain and are generally involved in setting up the solar systems for end users. This entails several tasks including site preparation, systems design and analysis, financial analysis, and maintenance. The major upside to companies with a high exposure to system integration is that as technologies improve in this phase of declining poly prices, margins are likely going to improve.

Solar System Components

There are three major elements of a solar PV system: solar modules, inverters, and an optional battery. The basic building blocks of a solar PV system are the solar modules which are interconnected to generate power. The direct current (DC) generated by the PV system has to be converted to alternating current (AC) to be usable by the electric grid. The PV inverter serves as the means by which power can be converted. (Note: An inverter is also grouped as a solar system component and will be covered in the following section.)

- **Batteries:** The purpose of a battery in a solar system is to collect and store energy for periods with little to no sunshine as an off-grid back-up. Several batteries are linked together to form what's called a bank, which is then enclosed by a battery box for security and ventilation purposes. A battery bank's size depends on the electric load, duration of required reserve power, and availability of a backup power source. Solar electric systems use two types of batteries: lead-acid, less expensive but more brittle, and gel cell, durable, costlier, and larger.

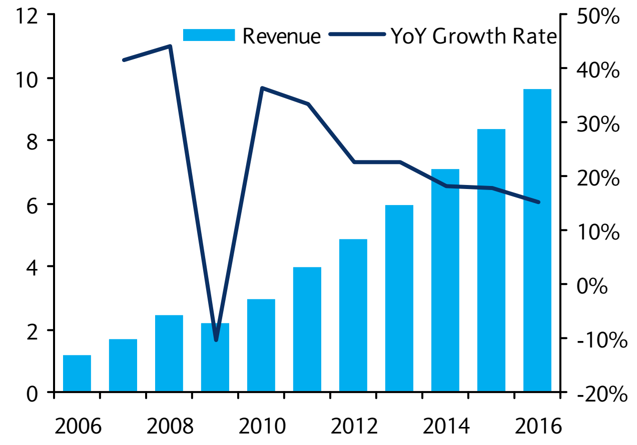
- **Charge controllers:** A charge controller directs the energy flow and prolongs the battery life of a system, serving to regulate voltages to prevent overcharging.

Inverters

In our view, the inverter serves as a key element of the PV system helping to translate captured energy into stable power.

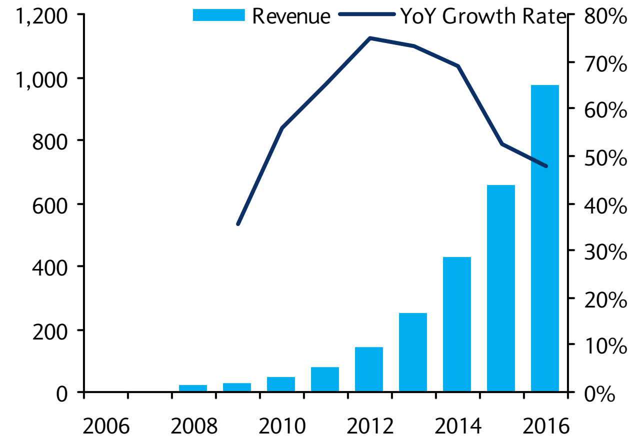
An inverter is an essential component of a PV system that converts DC power from the PV array to high-voltage AC power. A micro-inverter is a device that converts DC power from a single solar module/panel to AC current as opposed to a centralized inverter that converts all the energy at once. Micro-inverters have sparked overall inverter demand as a result of their relatively longer lifetime of 20-22 years as compared to the 10-12 years of centralized inverters. Micro-inverters have lower maintenance costs and harvest more energy because they target each individual panel eliminating the threat of single point failure. The major headwind to the inverter industry is the high price of the micro-inverter which carries a 15% price premium to centralized inverters, according to Enphase. In 2010, 99% of the solar inverters deployed were traditional central inverters. According to IMS, the global market for inverter technology was roughly 20 GW in 2010, valued at $5.5 billion, and is expected to grow to 34 GW, or $8.2 billion, by 2014. An inverter represents less than 10% of the system cost.

Figure 124: Inverter Revenue Forecast ($ bn)



Source: Frost and Sullivan

Figure 125: Micro-Inverter Revenue Forecast ($ mn)



Source: Frost and Sullivan

Where Does the Value Sit?

Like most defined semiconductor processes, with each step down the value chain, each incremental process layers on a material amount of differentiation. This is one of the reasons module vendors are looking to make the transition to systems providers. The latter market provides the stickiest customer relationships as well as highest competitive margin opportunities (a clear similarity to other areas in the clean technology space).

In the polysilicon space, the ability to have the lowest cost of production (through either technology or lower input costs such as power) as well as solar grade manufacturing capabilities is the key differentiator. It is very much a cost game, and thus the most "commodity-like" part of the solar value chain.

As we move into the module arena, the ability to design high-efficiency/lower-cost cells serves as the primary differentiator among vendors. There is of course an increased level of sophistication and technological know-how in this part of the process. For example, First Solar historically built strong market leadership using its proprietary thin-film technology which enabled it to deliver the lowest cost modules. This share leadership was achieved even though its cell efficiency was comparatively lower than those provided by traditional crystalline vendors.

However, efficiency only gets you so far. As modules continue to decline in price, the cost advantage of any specific cell diminishes increasing the "commoditization" of the module market. What doesn't diminish is the need for vendors to back their product. Vendors need to be able to offer a warranty for their products for a period no less than 20+ years in order to sell it. In our view, the ability to offer a warranty for products will serve as a key factor separating vendors during the current period of consolidation.

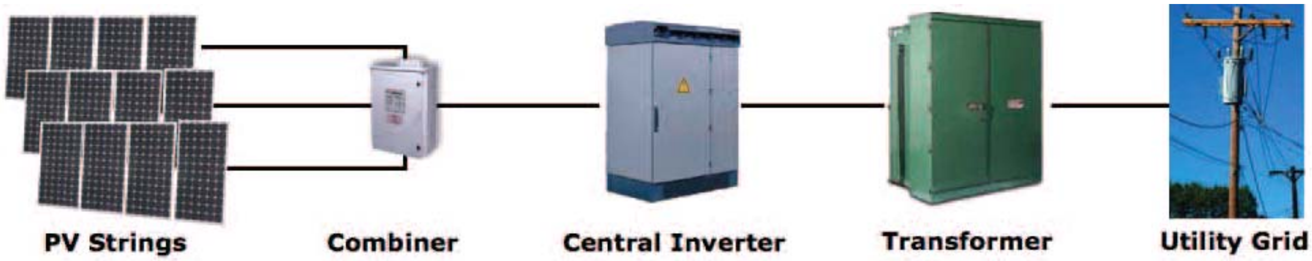
The systems component of the food chain has the highest level of technology differentiation. At the very fundamental level, the value of a PV system is in its ability to efficiently capture sunlight and convert it to energy. Given the number of components, the need to optimize placement, get the system to the right size and ensure accurate conversion, make the system a highly complex installation. Moreover, similar to module vendors, the ability to guarantee effectiveness and, more importantly, service to the system will serve as a key differentiator in the market.

Balance of Systems

Balance of systems costs, not just module costs, need to be considered when assessing the likelihood of PV becoming a viable alternative to traditional energy generation.

When thinking about the balance of system (BoS), industry experts usually refer to all of the up-front costs associated with a PV system, except the module. This entails mounting and racking components, inverters, wiring, installation labor, financing, permitting, contractual costs, and interconnection among others. In order words, the balance of system costs include the electrical system, structural system, and overall site management.

Figure 126: Electrical System



Source: Rocky Mountain Institute

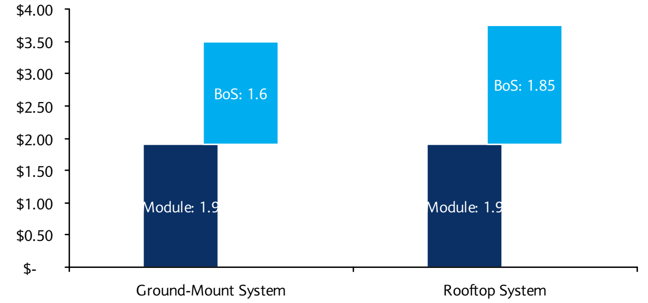
Figure 127: Project Development Cycle

Project Development	Contract Development	Authorization	Pre Construction	Installation and Testing	Operate, Monitor and Maintain
- Identify potential Project - Attract customers - Review bids - Internally generate plan	- Sign binding letter of intent - Design blueprints - Secure funding - Allocate Risk	- Obtain municipal, county, energy commission, and any other needed permits - PPA Approval from State Utilities Commission - Can take a long time	- Prepare land for construction - Obtain equipment - Finalize project specifications	- Install - Ensure grid reliability	- Occurs over the life of a plant - Includes terms regarding employees, reporting and auditing - Minimize future costs - Meet planned output levels

Source: Barclays Capital

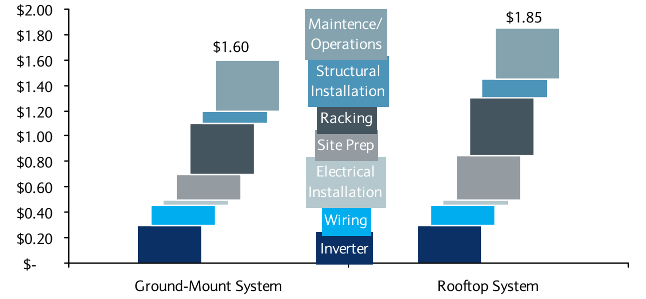
Generally, the module makes up between 50% to 60% of the entire systems cost. This cost is generally determined by the upstream players in the supply chain, as far up as the polysilicon suppliers, and overall poly spot prices. The remaining 40%-50% is made up by the balance of system. With the decline in module costs, overall BoS increases as a component of the total cost of a PV installation. This cost is generally dependent on the overall demand environment and awarded contracts. Because of some built-in fixed costs like permitting, labor, and site preparation, the balance of systems cost is less variable than module prices, though we believe a reduction in both is necessary to increase the value proposition for solar systems.

Figure 128: PV System (2010 $/W)



Source: Rocky Mountain Institute

Figure 129: BoS Breakdown (2010 $/W)



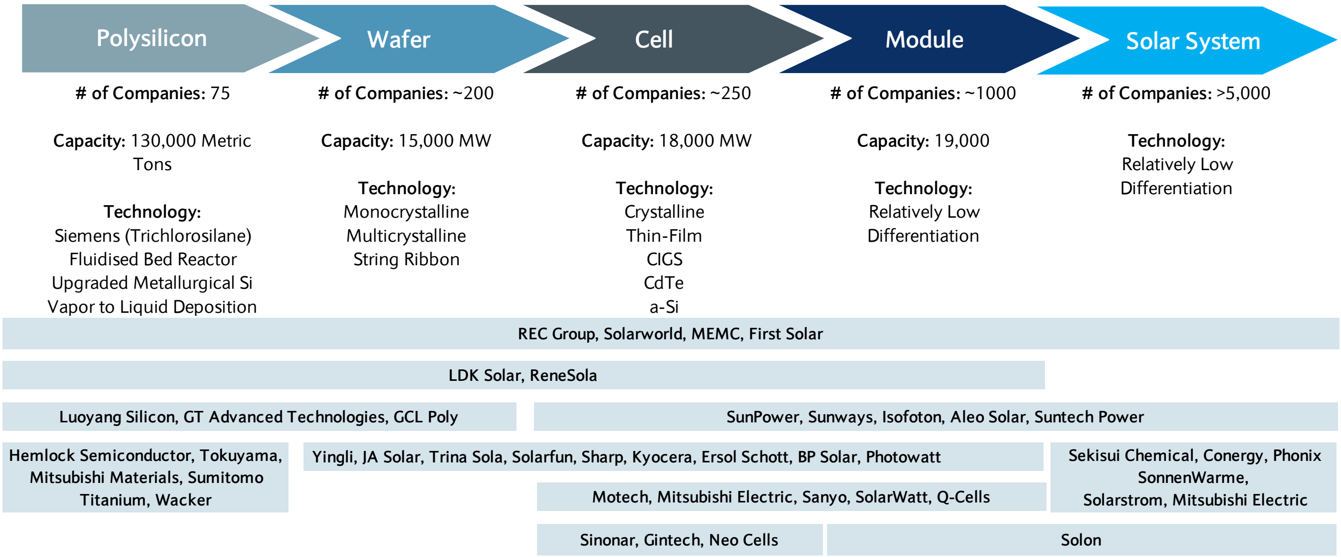
Source: Rocky Mountain Institute

Competitive Landscape

In our view, the competitive landscape is ripe for consolidation and, more likely, rationalization.

The solar value chain has evolved over the last several years as already developed technologies mature. Certain vendors look to specialize on one aspect of the market while other have gone on to expand their presence in other areas of the food chain. Given the current demand environment, in our view, there are too many players currently making too little money in the space to make it to the next phase of the market's evolution. A direct result of this large supplier base will be consolidation or, more likely, rationalization (vendors departing the market) in order to crowd out some of the smaller manufacturers as well as explore opportunities in other areas of the value chain.

Figure 130: Select Solar Value Chain Companies


Polysilicon
Wafer
Cell
Module
Solar System
# of Companies: 75
# of Companies: ~200
# of Companies: ~250
# of Companies: ~1000
# of Companies: >5,000
Capacity: 130,000 Metric Tons
Capacity: 15,000 MW
Capacity: 18,000 MW
Capacity: 19,000
Technology: Relatively Low Differentiation
Technology: Siemens (Trichlorosilane) Fluidised Bed Reactor Upgraded Metallurgical Si Vapor to Liquid Deposition
Technology: Monocrystalline Multicrystalline String Ribbon
Technology: Crystalline Thin-Film CIGS CdTe a-Si
Technology: Relatively Low Differentiation
REC Group, Solarworld, MEMC, First Solar
LDK Solar, ReneSola
Luoyang Silicon, GT Advanced Technologies, GCL Poly
SunPower, Sunways, Isofoton, Aleo Solar, Suntech Power
Hemlock Semiconductor, Tokuyama, Mitsubishi Materials, Sumitomo Titanium, Wacker
Yingli, JA Solar, Trina Sola, Solarfun, Sharp, Kyocera, Ersol Schott, BP Solar, Photowatt
Sekisui Chemical, Conergy, Phonix SonnenWarme, Solarstrom, Mitsubishi Electric
Motech, Mitsubishi Electric, Sanyo, SolarWatt, Q-Cells
Sinonar, Gintech, Neo Cells
Solon

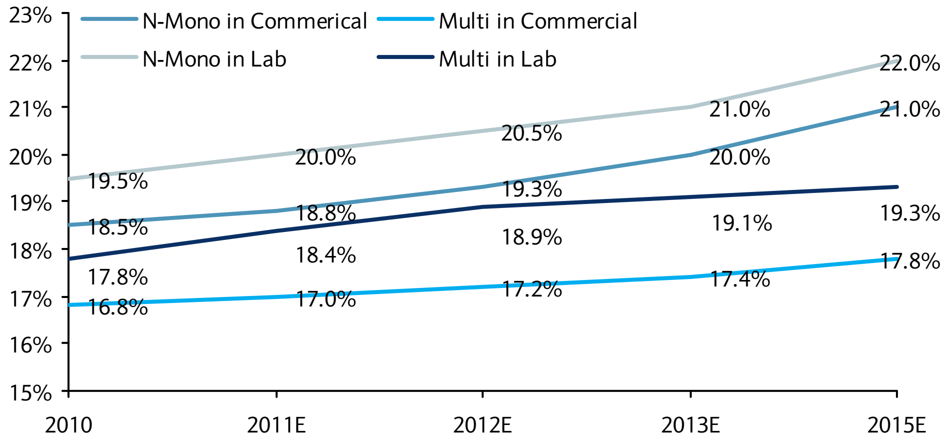
Source: Barclays Capital, EPIA

These factors are likely to define the competitive landscape over the next 12-24 months:

- **Consolidation and More Likely Rationalization:** During our recent visit to Solar Power International, one of the largest U.S. industry trade shows, we were struck by the number of module/panel providers in attendance that could not provide a viable answer as to why their solution is materially different from their competitors' offering. Moreover, the combination of smaller vendors already facing financial difficulties, the entrance of vendors such as GE, Samsung, LG is only going to heighten pressures on stand-alone module providers. In some cases, we may see some consolidation (driven by needs such as increased scale and potentially some intellectual property); however, we believe it is more likely we will see increased rationalization (i.e., vendors exiting the market) over the next 12-24 months, similar to what we saw in the DRAM market in 2005-08.

- **Technology Differentiation is Good, but Scale is Better:** We believe select vendors will continue to invest in their technology so they can provide improved energy generation to end customers. However, a material step up in functionality is unlikely, in our view, for at least the neat term (e.g., Yingli expects to improve commercial multicrystalline efficiency from 16.8% in 2010 to 17.8% in 2015). Therefore, we continue to believe companies will invest in their technology; it will be competitive necessity vs. incremental differentiation, in our view. Given limited technological differentiation, we believe scale will be a key differentiator. Like with most technologies, scale matters because of costs of manufacturing. As we see it, the ideal recipe for a technology's success is efficient technology coupled with manufacturing capacity and attractive cost structures.

Figure 131: Yingli Solar Efficiencies



Source: Yingli

- **Bankability Will Separate Vendors:** A concern for the demand side of the industry is bankability and overall solvency of the manufacturer. Various examples in recent months have demonstrated that being well capitalized is crucial in the current environment. The overall less-than-expected demand and tightened financing markets leave vendors relying on their balance sheets for support. In addition, utilities and energy providers are generally willing to pay a premium for panels manufactured by established players. This is primarily due to energy providers seeking companies that can fulfil their warranties and guarantees over an extended period. Currently, most manufacturers are offering guarantees lasting 20-25 years.

Market Outlook

Principal Factors Affecting Market Trajectory

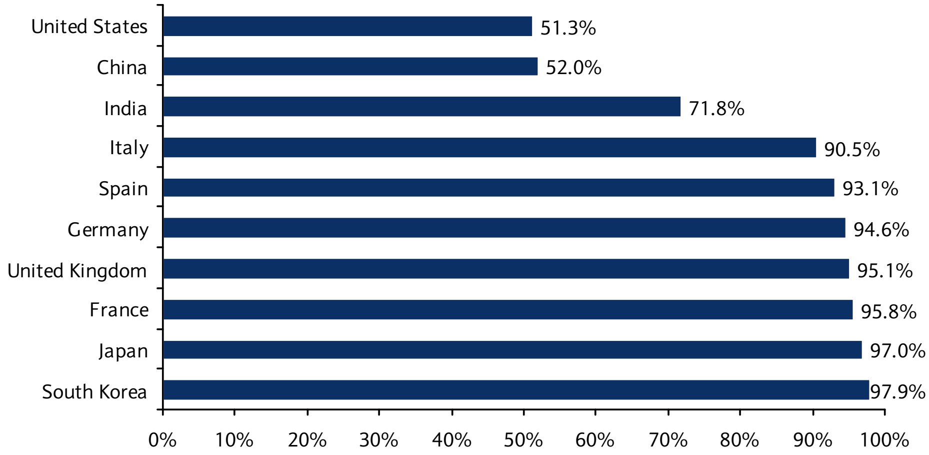
Government Directives/Targets

In our view, the most important driver for the solar industry stems from government targets and mandates. We expect governments to continue to incentivize renewable adoptions over the long term despite today's economic climate. While we believe there are some headwinds, given retroactive feed-in tariff cuts and latest comments from German Chancellor, Angela Merkel, expressing concerns on the long-term viability of the solar market in Germany, we still expect government to be the greatest driver until we reach grid parity. Targets like Renewable Portfolio Standards in the United States, aggressive alternative energy targets in China, and the EU 2020 Directive, to name a few, will continue to foster growth as countries will implement plans to meet their targets.

Energy Security

With a depleting energy supply, particularly with everyday combustibles including coal, oil, and natural gas, and growing energy demand, countries and energy providers are finding it increasingly more important to lock-in renewable energy sources sooner rather than later. In the near term, countries are hedging their energy supply by increasing dependence on traditional energy sources domestically as opposed to importing energy. We expect this trend to persist with an increasing adoption of renewable energy sources for electricity, solar being the primary source, as countries continue to decrease dependence on others for energy.

Figure 132: Oil Imports/Oil Consumption (2009)



Source: EIA

Technology

One of the ways to control costs associated with solar farm installations, the principle headwind for grid parity, is improved cell efficiencies. As more energy is generated per solar cell, fewer solar cells need to be installed, decreasing the overall systems cost. The second major component, in addition to improved cell efficiencies, is developing technology that is scalable. In the market, lab-tested cells have reached efficiencies as high as 40% but aren't even close to being scalable, which leaves them useless in the commercial market. Finally, energy providers seek technology that is extremely differentiated to prevent competing technologies from making theirs obsolete. The market between c-Si and thin-film cells is increasingly becoming competitive as thin film gains share and improves efficiencies.

Rising Demand from Emerging Economies

Demand in the emerging economies will be driven by two major catalysts, in our view. First, overall economic growth in emerging economies, like India and China, will create an upward pressure on energy demand, fostering the adoption of renewable energy sources. For example, China is offering a variety of feed-in tariffs and incentives to reach its 2020 50 GW target. Second, utilities in countries with aging infrastructure will take initiative to improve the overall grid and energy sources. In 2001, Enel, the major utility of Italy, embarked on a wide-scale grid improvement project spending $2 billion to install meters. This proactive step has made Italy the most developed metering country in Europe today. We can expect to see similar projects in the solar sector as well.

Market Constraints

Overall Economic Climate

Despite poly pricing coming down as a result of oversupply in the recent months, the overall economic climate has slowed the adoption cycle across the board for renewables. Specifically, the solar PV market is very much dependent on global economic conditions and the availability of relatively affordable financing. A continuation of the global economic slowdown and general tightening of credit markets could significantly impact demand and the overall adoption cycle. Additionally, given the current pricing declines, one would expect strong IRRs as a result of entire systems cost reductions to drive demand. However, this is not the case as energy providers are increasingly risk averse considering today's macro-economic outlook.

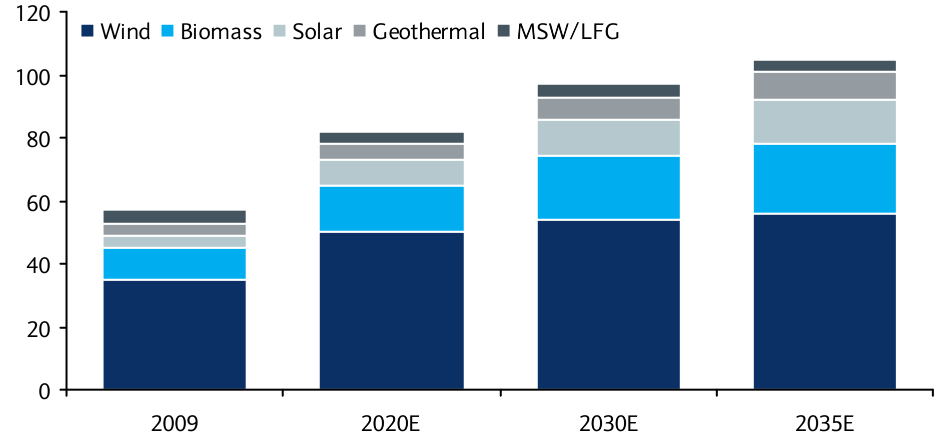
Diminishing Incentive Structure

Although we expect government targets to foster some material growth, government subsidies and grants make the IRRs for solar projects attractive and drive electricity costs close to grid parity. With diminishing incentive structures across much of the industry, the cost of renewable energy naturally increases, likely driving down demand. For example, the grant program within The 2009 American Recovery and Reinvestment Act has been a major catalyst for renewable projects over the last few years. The alternative left in the U.S. is the investment tax credits that are expiring in 2016. Similarly, as austerity is the trend among European countries, we have seen a number of FiT cuts across major markets including Italy, Germany, and Spain.

Competitiveness of Solar vs. Other Alternative Energy Sources

If cost reduction efforts gain momentum with other alternative energy sources, particularly wind, geothermal, or solar thermal, we believe solar PV energy will face competition in the marketplace. We can expect similar competition if technological innovation with alternative fuel sources outpaces solar PV innovation. However, over the next few years, we expect solar PV to independently gain strong traction. According to the EIA, over the next 20 years, wind and biomass capacity and electricity generation will outpace solar, driven by technological improvements that make previously marginal sites attractive for development along with Federal mandates that require increased use of biofuels.

Figure 133: U.S. Renewable Capacity Projection (GW)



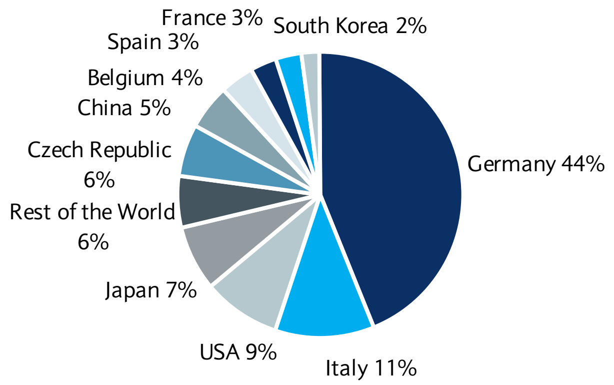
Source: EIA. MSW = municipal solid waste. LFG = landfill gas

Geographic Snapshot

We believe that a shift in geographic demand is likely to alter market dynamics.

As highlighted earlier, there is currently an overall shift in the global demand profile in the solar industry. While we do not expect to see material shifts in cumulative installed capacity — the current leaders are likely to remain leaders (namely Germany and Italy) — considering the slowdown in global demand, we do expect several countries (United States, China, and India) to lead annual capacity installations. The historical growth in Europe was driven by the EU 2020 Directive, which led to the implementation of feed-in tariffs fostering the growth of solar demand. However, with the current economic climate in Europe, we expect demand growth to come from some of the "emerging solar markets." The growth in the United States will primarily come from state initiatives that support solar installations. In India and China, growing energy demand and the desire to improve energy security is likely to support overall capacity installations.

Figure 134: The PV World Market 2011



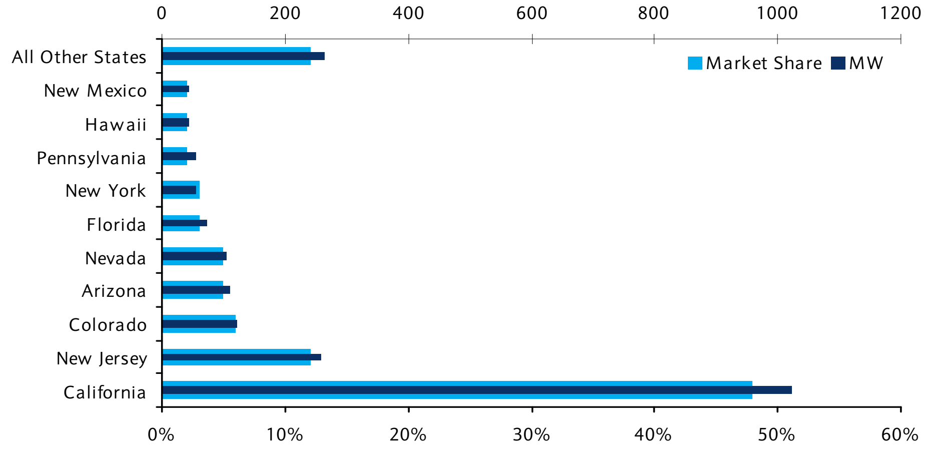
Source: EPIA, Barclays Capital Estimates

North America

Market Dynamics

In 2010, North America brought 990 MW of PV capacity online, yielding a total of 2.79 GW of cumulative installed capacity, according to Frost and Sullivan. Considering the solar irradiation in the region, over 90% of the North American installations are in the United States, driven by aggressive state initiatives in California, New Jersey, Colorado, and Arizona. Over the next several years, we expect North America, specifically the United States, to absorb some of the displaced demand from Europe as several states have strong renewable portfolio standards that are encouraging investments in utility-scale solar projects. However, with the expiration of the ARRA (American Recovery and Reinvestment Act) Federal Grant Program this year, lending $9.15 billion, the rate of project growth may decline modestly as energy providers try to expedite future projects into 2011 to receive a grant instead of the tax credits promised till 2016.

Figure 135: Top 10 States by Cumulative Capacity and U.S. Market Share



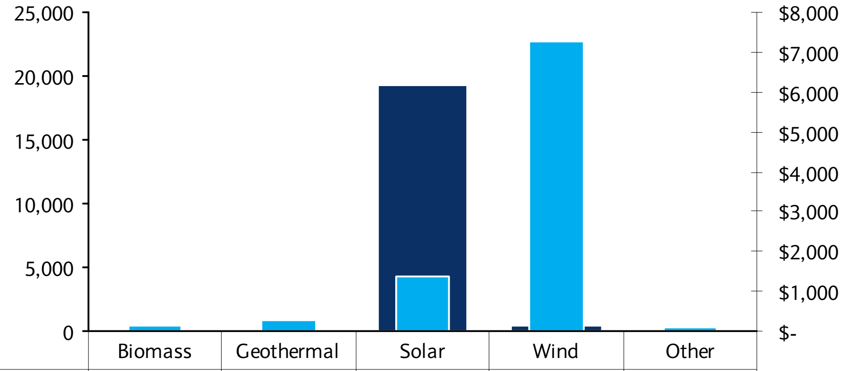
Source: Interstate Renewable Energy Council

Legislative Landscape

In the United States, the ARRA Federal Grant Program is expiring in December 2011, but tax credits for both residential and commercial installations are in place through 2016. The tax credit is equal to 30% of expenditures with no limit to the maximum amount for a qualified solar facility. This tax credit reduces the taxpayer's liability for a portion of the cost of buying and installing a solar energy system. In addition to Federal incentives, demand is also driven by states with renewable portfolio standards. For example, California has launched a 10-year, $3 billion Go Solar California campaign, which awarded $227 million in incentives to install over 175 MW of capacity in 2010 to meet its 2013 RPS requirement of 20% and 33% by 2020. In New Jersey, the RPS requirement for solar is 306 GWh in 2011 to 5,316 GWh in 2026. New Jersey offers rebates as high as $78 million in 2006 and $47 million in 2010 to meet its target. Finally, on the Canadian side, Ontario installed 168 MW in 2010 sponsored by a feed-in tariff program from 2008.

More ARRA dollars were spent on Wind projects than all other alternative energy projects combined.

Figure 136: ARRA Alternative Energy Projects



	Biomass	Geothermal	Solar	Wind	Other
■ Project Number	40	50	19246	443	96
■ $ Millions	$151	$280	$1,353	$7,282	$88

Source: Department of Treasury

Europe

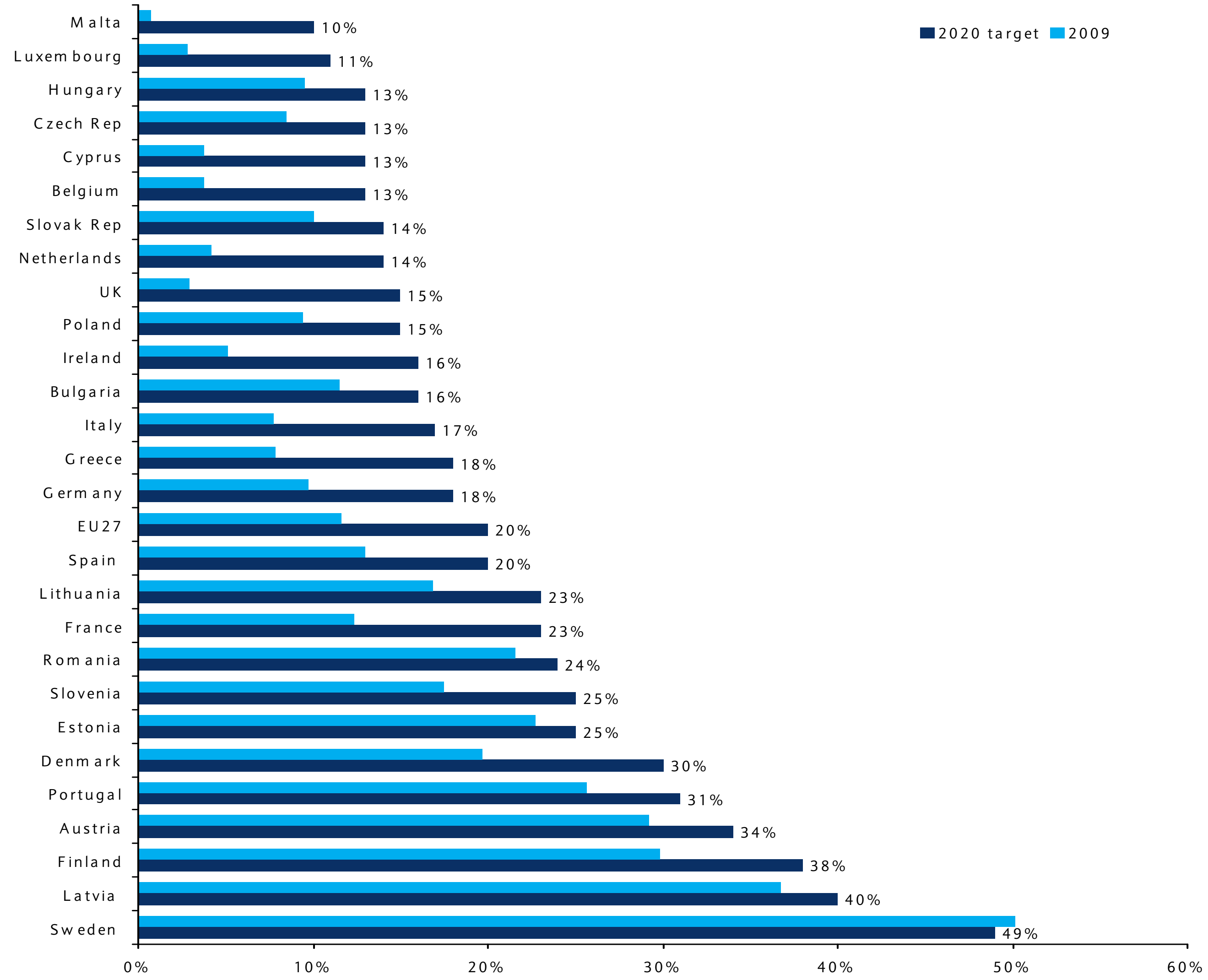
Market Dynamics

In 2010, Europe brought 13.3 MW of PV capacity representing approximately 80% of total global installed solar PV capacity in 2010. Europe has been the most aggressive in renewable energy sources over the last several years globally largely due to the EU Directive and overall aging infrastructure in Europe. The European region, driven by Italy and Germany, was the largest market for PV in 2010. Germany is the world's largest PV market with >15 GW of cumulative installed capacity according to EPIA. This is equivalent to two standard nuclear power plants. Another promising market in Europe is Italy because of its high exposure to the Sun and favorable legislative structure. The country currently has more than 1.5GW of installed capacity. Since 2008, Spain's solar program has struggled as a result of the financial crisis and instability in political decisions. Belgium, the Czech Republic, Greece, and Portugal are in a similar situation to Spain whereby solar installations which gained momentum prior to economic concerns in Europe subsided with measures of fiscal austerity in this economic climate.

Legislative Landscape

The greatest driver for Europe's renewable energy initiative is the EU 2020 Directive. The Directive sets several clean energy targets for the European Union. The EU plans to reduce greenhouse gas emissions by at least 20% from 1990 levels, improve energy efficiency by 20%, raise the share of renewable energy by 20%, and increase the level of biofuels in transport fuel by 10%. We expect the 2020 directive to spearhead demand across the entire alternative energy sector. Many of the more active players in the EU have their own internal incentive systems to meet the 2020 directive. However, fiscal austerity measures across Europe have curbed demand in the near term and we do not expect to see robust growth like we did over the last several years.

Figure 137: EU 2020 Directive Progress Report



Source: European Energy Commission

Asian Markets

Market Dynamics

The Asian markets growth for solar PV is primarily led by Japan, China, and South Korea. Japan has been fostering the growth of its solar initiative through various financing means including utility mandates, subsidy programs, and Japan's Ministry of Economy, Trade and Industry (METI) action plan which set targets to increase solar installations 10x by 2020 and 40x by 2030. China, as the largest manufacturing center for solar cells in the world, has naturally developed a domestic demand for PV infrastructure. China has been aggressive with its targets aiming to hit 50 GW of installed capacity by 2020. China currently only has about 2 GW of capacity installed and expects to install another 8 GW by 2015. The remaining 40 GW are expected to be installed by 2020. South Korea is one of the largest solar power markets as a result of its feed-in tariff. However, growth was stunted in 2009 when the government reduced the FiT in 2009 by 66% stunting the growth of larger sized plants. In India, the irradiation levels are favorable for solar generated electricity as India experiences 300 sunny days a year. With increasing energy demands and government support to implement renewable energy in the region, we expect India to be another country to track as its appetite for solar energy increases.

Legislative Landscape

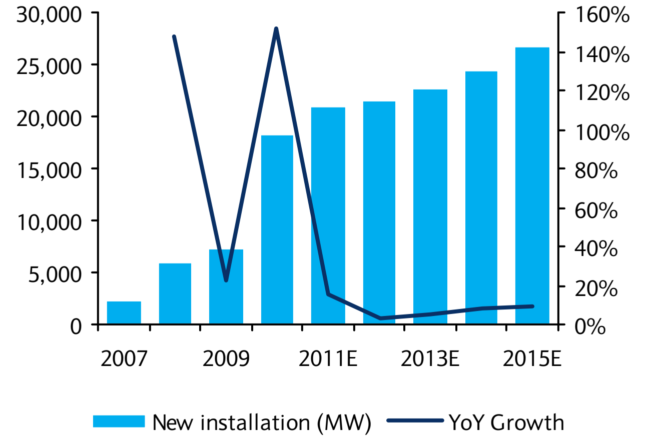
Japan has been active on the legislative front offering subsidies for residential PV systems and requiring electric utilities to purchase surplus PV power. Japan increased its 2020 target for PV installed capacity from 14 GW to 28 GW and 53 GW by 2030. China recently instituted a feed-in tariff policy of $0.15 kWh in July that has resulted in a non-residential PV project pipeline of 14 GW. The top five province pipelines in terms of MW are Qinghai, Gansu, Ningxia, Inner Mongolia, and Sichuan. The Ministry of Knowledge Economy in South Korea proposed the construction of one million green homes and 200 green villages by 2020. To support this target, the government offers 60% of the initial PV system cost for private households and 100% of public multi-family households. In December 2010 the National Assembly of South Korea passed renewable portfolio standards mandating 2% renewable power generation by 2012 and increasing each subsequent year by 0.5 –1% reaching 4% by 2016 and 10% by 2022. In July 2009, the Indian Government set a $19 billion plan to produce 20 GW of solar power by 2020 requiring all government facilities, hospitals, and hotels to make the use of solar-powered equipment.

Our View

Expect Near-Term Pressure

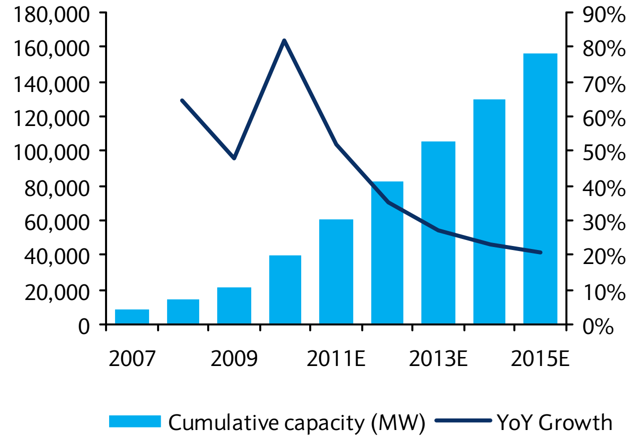
Our global solar market estimates look for 21 GW of newly installed capacity in 2011 vs. approximately 18 GW in 2010, largely driven by demand in the United States, China, and Japan, offset in part by declining additions in Germany and Italy.

Figure 138: Annual Capacity Installations (MW)



Source: Barclays Capital

Figure 139: Cumulative Capacity Installations



Source: Barclays Capital

Based on current commentary from the market, we believe there is certainly potential downside risk to our near-term view. Broadly, we believe that global demand could fluctuate between flattish to up 10% for the year (between 18GW and 20GW) largely based on demand declines in both Germany and Italy. We believe that the demand decline in both regions has been in part due to broader macro concerns and instability with consumer confidence in both regions. In other words, absent stability in the broader macro picture, we believe that potential demand headwinds have emerged despite the material reduction of module prices. Potential offsetting factors include demand in the United States and China, which has been increasingly gaining traction in recent years, and thus becoming a larger component of global demand.

Longer term, we remain fairly optimistic about growth in the United States and China, other new markets such as India and South Africa, as well as some level of stabilization in Europe, and thus look for incremental growth in 2012 of approximately 1GW even if we end up at the lower end of our downside market estimate. Our belief is that following a period of consolidation, we expect some level of demand elasticity to emerge given the substantial decline in price points for modules, which are approaching (or are at) $1.00/watt vs. $3.00/watt in 2008. We note, however, that in general the broader market is typically softer in the first half of the year compared to the second half, and thus visibility on demand trajectory is unlikely to emerge until 2H12. We therefore believe investors are best positioned to remain cautious at this juncture given potential for downside risk to market estimates and limited near-term visibility on the trajectory of the market until signs of stability in the market led by demand elasticity emerge.

Too Early to Make the Survival Call

Ahead of a period of consolidation, and more likely rationalization in the solar market, we recommend investors take a cautious approach to the space. The bottom line is that:

1) Declining prices through the poly supply and component markets has diminished technological differentiation and has vendors scrambling to manage costs and inventory;

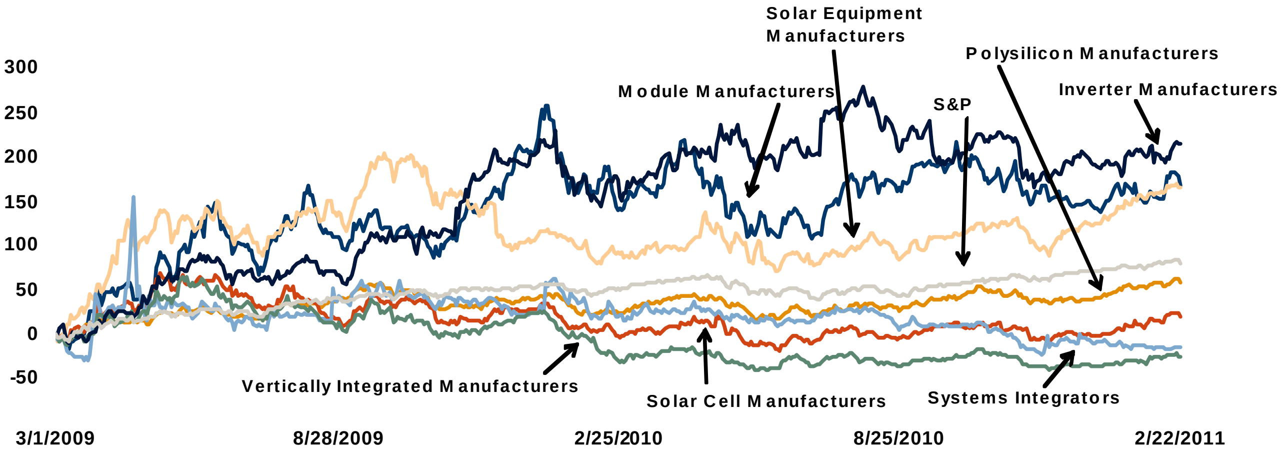
2) Austerity measures are putting increased pressure on incentives previously needed to grow the market; and

3) The largest growth over the next five years is expected to come from a region that typically favors local suppliers.

With a high level of overcapacity still in the market, we believe investors should wait for consolidation/rationalization to take place ahead of assessing the long-term outperformers in the market.

Our cautious near-term stance does not foreshadow longer-term caution in the market. On the contrary, we believe that as signs of a bottom emerge (e.g., increased vendors exiting the market, financing for low-cost tier-2 and tier-3 Chinese vendors dries up, production reduction by polysilicon providers and stabilization in module price declines), we believe investors should look at our broader clean technology investment criteria to select names that should do well longer term. In other words, companies with scale, some level of technological differentiation, and a healthy capital structure are clearly in a position to bridge the gap toward longer-term success. In looking at the performance of the value chain from the prior market bottom (March 2009) to the recent peak for solar shares (February 2011), we can clearly see a distinction on how certain parts of the value chain performed.

Figure 140: Solar Industry Relative Price Performance



Source: Barclays Capital, FactSet
Note: Polysilicon Manufacturers: LDK, OCI, Shin-Etsu, Sino-American, SOL, Sumco, Tokuyama, Topco, WCH, WFR
Solar Cell Manufacturers: CSUN, ENER, ErSol, E-Ton, ESLR, FSLR, JASO, Motech, Q-Cells, SPWRA, STP
Module Manufacturers: Aleo Solar, CSIQ, Solar-Fabrik, Solarfun, Solartron, Solon
System Integrators: CMH, Centrosolar, Conergy, Solarstrom, Sunways
Vertically Integrated Manufacturers: REC, Solar World, TSL, YGE
Solar Equipment: BTUI, Centrotherm, GTAT, Manz Automation, Meyer Burger, Oerlikon, Roth & Rau, SPIR
Inverter Manufacturers: PWER, SATC, SMA

Figure 139 shows that as demand began to increase globally, both module vendors and equipment suppliers outperformed the broader food chain. However, technology vendors that have a higher degree of differentiation were the top performers, while more “commodity”-like suppliers (i.e., poly vendors) performed less well. Systems integrators and vertically integrated suppliers relatively underperformed, in our view, as this period in the market’s evolution was a “supply” fed industry, and thus the comparatively higher BoS costs were still somewhat of an impediment to taping the market’s potential.

We believe that, after a period of rationalization, the next leg of the solar market’s evolution will be demand led. Therefore, the systems integrators, vertically integrated players, and the companies that have high technology differentiation, like the inverter providers, are likely to emerge as the relative outperformers — as such, it’s worth watching for signs that the period of consolidation is ending.

POWER-ONE INC. (PWER; 1-OVERWEIGHT/2-NEU); PRICE TARGET $7

PWER

Stock Rating
1-OVERWEIGHT

Sector View
2-NEUTRAL

Price Target
USD 7.00

Price (08-Nov-2011)
USD 5.53

Potential Upside/Downside
+27%

Power-One Inc.(PWER): Quarterly and Annual EPS (USD)

	2010	2011			2012			Change y/y	
FY Dec	**Actual**	**Old**	**New**	**Cons**	**Old**	**New**	**Cons**	**2011**	**2012**
Q1	0.04A	N/A	0.20A	0.20A	N/A	0.14E	0.13E	400%	-30%
Q2	0.17A	N/A	0.21A	0.21A	N/A	0.16E	0.15E	24%	-24%
Q3	0.40A	N/A	0.27A	0.27A	N/A	0.18E	0.17E	-32%	-33%
Q4	0.35A	N/A	0.14E	0.15E	N/A	0.20E	0.19E	-60%	43%
Year	0.96A	N/A	0.82E	0.83E	N/A	0.68E	0.68E	-15%	-17%
P/E	5.8		6.7			8.1			

Source: Barclays Capital
Factset

COMPANY SNAPSHOT

Power-One U.S. Clean Technology and Renewables

Income statement ($mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	1,047	982	999	1,081	1.1%
EBITDA	280	181	163	186	-12.8%
EBIT	265	170	158	181	-11.9%
Pre-tax income	239	192	163	186	-8.1%
Net income	136	130	108	123	-3.3%
Reported EPS ($)	0.96	0.82	0.68	0.78	-6.8%
Diluted shares (m)	141.9	158	158	158	3.7%
Dividend per share ($)	NA	NA	NA	NA	NA

Margin and return data (%)					Average
EBITDA margin	26.7	18.4	16.3	17.2	19.7
EBIT margin	25.3	17.3	15.9	16.7	18.8
Pre-tax margin	22.9	19.6	16.3	17.2	19.0
Net margin	13.0	13.3	10.8	11.4	12.1
ROIC	172.0	48.7	41.9	43.6	76.5
ROA	17.8	17.8	12.9	12.7	15.3
ROE	48.1	33.7	22.0	20.1	31.0

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	63	82	86	90	12.3%
Intangible fixed assets	19	18	18	18	-1.4%
Cash and equivalents	228	190	281	376	18.2%
Total assets	762	732	837	965	8.2%
Short and long-term debt	36	36	36	36	0.0%
Other long-term liabilities	444	309	310	319	-10.4%
Total liabilities	480	345	346	355	-9.5%
Net debt/(funds)	(192)	(154)	(245)	(340)	NA
Shareholders' equity	282	386	491	610	29.3%
Change in working capital	(11)	139	10	20	NA
Operating cash flow	210	(18)	99	104	-20.8%
Capital expenditure	28	23	8	9	-31.9%
Free cash flow	201	19	105	111	-17.9%

Valuation and leverage metrics					Average
P/E (x)	5.8	6.7	8.1	7.1	6.9
EV/EBITDA (x)	2.1	4.0	3.9	2.9	3.2
FCF yield (%)	25.6	2.1	12.0	12.7	13.1
Price/sales (x)	0.7	0.9	0.9	0.8	0.8
Price/BV (x)	2.8	2.3	1.8	1.4	2.1
Dividend yield (%)	0.0	0.0	0.0	0.0	0.0
Total debt/capital (%)	11.3	8.5	6.8	5.6	8.1

Selected operating metrics ($mn)					
Renewable Energy Revenue	715.4	669.2	699.8	771.3	2.5%
YoY Growth Rate	456%	-6.5%	4.6%	10.2%	NA
Power Solutions Revenue	331.7	312.4	298.9	309.6	-2.3%
YoY Growth Rate	9.5%	-5.8%	-4.3%	3.6%	NA
Inverter Market Value	3000	4000	4900	6000	26.0%
YoY Growth Rate	36.4%	33.3%	22.5%	22.4%	NA
Micro-Inverter Market Value	51.3	84.7	148	256.5	71.0%
YoY Growth Rate	55.9%	65.1%	74.7%	73.3%	NA

Source: Company Data, Barclays Capital, Frost and Sullivan

Stock Rating	1-OVERWEIGHT
Sector View	2-NEUTRAL
Price (08-Nov-2011)	$ 5.53
Price Target	$ 7.00
Ticker	PWER

Investment case

Our 1-Overweight rating is predicated on our expectations for continued share growth and the relative defensibility of inverters vs. more commoditized areas in the solar market. Our $7 target equates to ~9x our CY13 EPS estimate of $0.78.

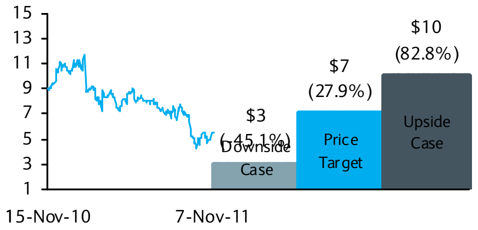
Upside case $10.00

Better than expected growth in Power's key (Italy) and emerging (U.S., India) markets could support a better than expected 2H12 suggesting high single digit and more normalized market growth (10%+) yielding an upside 2013 EPS of $1.00-multiple expansion to 10x yields an upside of $10.

Downside case $3.00

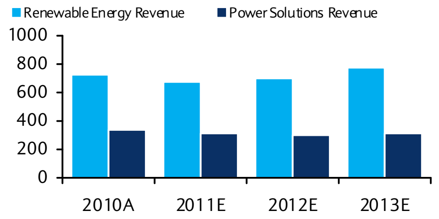
Further tepid demand in EUR and a slow take up rate in emerging markets could jeopardize PWER's growth through 2013. Further pricing pressure could exacerbate impact of rev declines on its bottom line yielding EPS closer to $0.50. Multiple compression (5-6x) yields a downside of $3.00.

Upside/downside scenarios



Source: FactSet

Revenue by Segment ($mn)



Note: FY end Dec.

POWER-ONE (PWER) – INITIATING COVERAGE AT 1-OW

We initiate coverage on Power-One (PWER) with a 1-Overweight rating and $7 price target.

We initiate coverage on Power-One (PWER) with a 1-Overweight/2-Neutral rating and $7 price target. Overall, we continue to believe the mix of oversupply of modules and uncertainty around regulatory initiatives will serve as headwinds for the solar industry. Given higher technology barriers to entry, the inverter market is one of the least commoditized part of the solar value chain. Power-One has been steadily gaining share in the market, and is positioned to capture opportunities in both North America and India (both growth markets) in the coming years.

Our 2012 estimates factor in continued near-term headwinds in Europe, followed by some stabilization in the back half of the year. We also look for healthy growth out of both the U.S. and Asia. For 2013, we look for continued demand strength, though note that our estimates are still below market growth expectations of 10%+. Though our outlook for PWER's bottom line factors in only modest gross margin expansion, we do expect some operating leverage to help the company's EPS.

We are establishing 2012 and 2013 sales and EPS estimates of $999 mn/$0.68 and $1,081 mn/$0.78, respectively. Our $7 price target is based on approximately 9x multiple on our CY13 sales

Company Description

Power-One is a global provider of inverters to the renewable and enterprise IT markets.

Founded in 1973 and headquartered in Camarillo, California, Power-One (Power) is a global provider of high-efficiency and high-density power supply products for various clean industries. Its products convert, process, and manage both alternating current (AC) and direct current (DC) for its customers. Power-One is currently the number two global supplier of PV inverters with a roughly 13% market share shipping 2.6 GW in 2010, behind SMA Solar Technology, which shipped approximately 18.5 GW and has a 42% share in the market. The PV inverter, a critical component in a solar energy system, serves as the means to feed an electrical current into a commercial grid or off-grid electrical network.

In June 2010, Power announced the completion of its two-year restructuring efforts and coinciding exit from its Dominican Republic plant. The purpose of this restructuring was to consolidate production to a global platform out of Slovakia, Italy, and China and provide $15 million in annual savings for the company. Power also completed its reorganization efforts (designed to protect its net operating losses). Power's business was broken down into two strategic business units based on the different market segments it serves: Renewable Energy Solutions Unit and Power Solutions Unit.

The Renewable Energy Solutions Unit offers inverters for solar and wind energy generation systems to convert electricity and feed it back to the grid. The Power Solutions Unit focuses on AC-to-DC and DC-to-DC power conversion products. Power hosts a diverse product portfolio with hundreds of different standard products and the ability to create custom products. Management's goal is to be a leading supplier of inverters to the market, regardless of a customer's specific needs. The company supplies various renewable and power-generating industries such as solar, wind, and conventional power communications.

PWER – Investment Positives

Share Gainer in a Critical Component of Solar PV Systems

An inverter is a critical component of a solar PV system. Serving as the primary means through which DC power generated by a solar panel is converted to AC power and fed into the grid, the inverter serves as a critical part of determining the efficiency of a system. Power has effectively been gaining share in the market from 3% in 2008 to 13% in 2010 and based on preliminary results thus far this year, has continued to gain share in 2011. The addition of its North American plant in Phoenix, Arizona, and a new plant in Shenzhen, China, should better position the company to capitalize on growth opportunities in the United States and Asia.

Diversified Product Portfolio

Power-One prides itself on having an extremely diverse product portfolio with hundreds of different standard products and the ability to create custom and semi-custom products. Such competencies are essential for an inverter supplier as customers' power generation sources and complementary projects sizes vary substantially. Power's diverse product portfolio offers products anywhere from converting DC power to AC power with its 300 watt to 30 kw Micro string inverters to large 1 MW turnkey station inverters for large installation customers. The company also manufactures products to improve overall efficiency in energy systems for both the renewable and conventional power generation industries while also customizing its products to international standards and country specifications. Recently, at Solar Power International, the company launched three new products for its Renewable Energy SBU to further broaden its array of products and services for the solar market. The company launched Aurora Vision, a systems solution composed of software, hardware and accessories; the Micro-0.3, an alternative to the string inverter; and Aurora Ultra-1400, the industry's largest solar power inverter designed for utility-grade installations.

Competitive Pricing Strategy

Based on our estimates, we believe that Power-One looks to leverage pricing as a component of its share gain strategy. Based on our checks, we do not believe that the company is looking to sacrifice margins for share though will be strategic in selectively responding to competitive maneuvering. We believe the company's constant focus on product innovation is in part driven by its goal to provide lower-cost and competitive solutions in the market.

PWER – Investment Risks

Concerns of Oversupply

Across multiple vendors, OEMs are adding capacity in order to meet growing demand in the inverter market. However, any demand decline could lead to oversupply in the market thus emerging as a headwind for vendors such as Power. Moreover, in the event of overcapacity vendors (particularly tier-2 and tier-3 vendors) often rely on pricing as a means to unload inventory.

Inverter Pricing – The Next Shoe to Drop?

Module prices, particularly in the last 6-12 months, have dropped substantially, reducing their overall contribution to the total cost of a system. Simultaneously, inverter prices have dropped, but not to the same extent. While we can try to believe there is less commoditization in the inverter market vs. modules, the risk that inverter pricing could fall under increased pressure could ultimately emerge. We note that leading vendors such as Power-One and SMA are looking for a 50% or so reduction in pricing over the next five years.

End Market Conditions

Renewable Energy Solutions' sales contribute 71% to Power's overall top line. Based on our estimates, we expect this contribution to only increase as inverter sales into the solar and wind market increase. Thus, while the company does not have any customers contributing greater than 10% of revenues, it is highly dependent on the success of this segment and its customers. Any delay could negatively impact its top line trajectory and subsequent earnings growth.

Competition from Asian Vendors

Though competitors out of Asia are much smaller in comparison to leading inverter providers, their potential impact — particularly as many seek out growth and government support — can not be discounted.

Our View

Overall, we consider Power-One an emerging player in the inverter market, having demonstrated an ability to gain share against a highly competitive backdrop in a difficult industry. The company's fortunes will undoubtedly be tied to growth opportunities for solar in general, and thus we can't completely divorce its prospects from what seems to be a challenged industry backdrop. That being said, we believe there is a bit more technology differentiation in inverters vs. other areas of the solar food chain, (such as modules) and therefore the industry is unlikely to see as severe pricing pressure overtime. We also believe that Power-One is making the right strategic move in positioning itself toward capitalizing on growth in North America and India, two key geographies when looking at new prospects for growth in the solar market.

From a margin perspective, the company should be able to improve efficiency in the coming quarters as it absorbs overhead costs related to its recent capacity expansion plans (e.g., China and the United States). We expect some of its cost improvements to be offset in part by pricing reductions, and therefore do not look for the company to return to prior high gross margin levels experienced in recent quarters (i.e., 40%); rather, we look for a fairly light range in the 30-35% area. Below, we highlight key thoughts around our investment framework on Power-One.

Figure 141: Power-One (PWER) Investment Framework

Market Growth Opportunity	◑	- Overall, we expect inverter sales to be directly linked to the solar market, and thus expect near-term headwinds, including questions regarding growth in Europe, to persist. - Market research estimates inverter growth in the 10-15% range over the next few years.
Potential for Share Gains	◕	- Power-One has demonstrated its ability to be nimble and gain share over once larger incumbent vendors. - We believe the company continues to gain share in key geographies such as the US and India where growth should outpace overall market growth.
Likelihood of Margin Expansion	◑	- With investment in capacity expansion (e.g. China and the US) behind the company, we look for improved utilization to help edge up margins. - We don't, however, expect margins to tick up to recent highs, but rather remain fairly range-bound in the low to mid-30s.
Barriers to Entry	◕	- Compared with the other areas along the solar food chain, inverters have relatively high technological barriers to entry. - The ability to drive efficiency in an inverter, while reducing the cost of its footprint and of its contribution to total BoS, is not easily replicated.
Capitalization	●	- The company is well capitalized with a general trend toward improved cash generation and lower debt levels. - Management has demonstrated its ability to tightly manage working capital in recent months.
Risk Profile	◑	- Potential risks include incremental pricing pressure as inverters have not experienced similar declines compared with other parts of the solar food chain. - While we prefer inverters vs. other areas within solar, the company cannot wholly divorce itself from broader industry challenges which remain dependent on government initiatives/subsidies to drive growth.
Valuation	◑	- In line with the rest of the solar sector, PWER is trading at near historical lows. - While we recognize that the solar market is currently at a challenging juncture, we can continue to believe that inverters are a relatively better place to be, and thus any stabilization in demand should lend more normalized multiples.

Source: Barclays Capital

Background

Power-One develops and manufactures power conversion technologies and equipment for the renewable and power generation market.

Founded by Dick Weisse in 1973, Power-One develops and manufactures power conversion technologies and equipment for the renewable and power generation market. It initially designed and provided products primarily for telecommunications and internet service providers, and communications equipment manufacturers. However, in 2006, Power entered the renewable energy market, which is still an area of rapid growth for the company today and began investing in this business in 2007. The company went through some senior management changes in 2008 with a vision to improve the company's global supply chain.

In June 2010, the company reorganized its business following the completion of a two-year restructuring plan.

Following the challenging markets and depressed demand in 2008 and 2009, Power-One proposed a reorganization of its business structure to protect its net operating loss carryforwards to offset income taxes. It underwent an internal "merger" of subsidiaries (for tax purposes) and formed New Power-One (referred to as Power-One). The shareholders approved this reorganization in June 2010. In the same month, Power announced the completion of its two year restructuring efforts and coinciding exit from its Dominican Republic plant. It reduced 29% of its workforce at a cost of $11.4 million in restructuring charges. Management expects this move to save $14-15 million annually.

The closing of the plant was the first step in realigning global manufacturing and sourcing and improving the supply chain process. Since then, the company has been investing in its supply chain and manufacturing capabilities in order to shift operations to a geographically central location to serve all of its end markets. The company shifted Power product manufacturing to Slovakia and opened a new floor space in Italy to maximize RE capacity. With respect to its Asian operations, Power is consolidating and expanding facilities in China and opening an office in Shanghai and Shenzhen. In order to serve the growing RE market and meet the renewable energy local content requirements, Power is also in the midst of adding U.S. production capacity and a Canadian Plant. The expansion plans in China and North America are critical as the opportunity in those regions is growing at a strong pace.

After the completion of its reorganization and restructuring efforts in June 2010, Power's business was reclassified into two strategic business units (SBU): Renewable Energy Solutions SBU and Power Solutions SBU. These units were designed to provide a more distinct focus on each of Power's end markets, that is, the solar and wind market and the power market. While each SBU is well immersed in power conversion technologies, they possess different manufacturing processes, supply chains, customers, and product design.

Power-One prides itself on having an extremely diverse product portfolio with hundreds of different standard products and the ability to create custom and semi-custom products. Its customers are distributed over the globe with more than 70% of 2010 sales out of Europe. No one customer contributed to more than 10% of Power's 2010 revenues. Customers include MEMC/SunEdison, BP Solar, GCL Solar, Suntech, Motorola, Siemens, Ericsson, Nokia Siemens Networks, Applied Materials, Lockheed Martin, Oracle, Google, Facebook, Cisco, IBM and more. The company's primary competitor in its Renewable SBU is SMA, but other competitors also include Fronius, KACO New Energy, Siemens, Satcon, SolarEdge, GE and Delta Electronics. In the power business, no single company dominates the market and companies compete on breadth of product line, technological advances, stability of provider and cost. Competitors include Emerson Electric, Delta Electronics, LiteOn, Lineage Power and Eltek Valere.

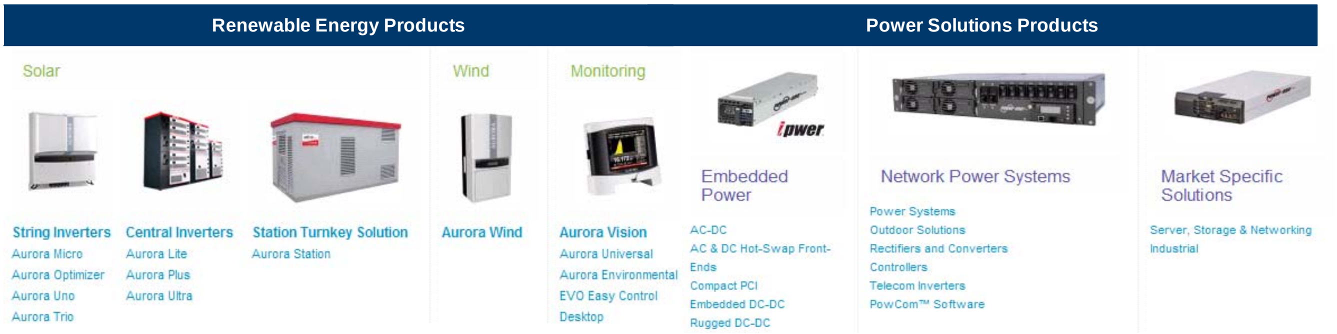
Power-One's Product Portfolio

Since the reorganization, Power-One reports earnings through its two strategic business units: the Renewable Energy Solutions Unit (RE) and the Power Solutions Unit. RE generally makes up 65-70% of the top line and Power 30-35%.

The Renewable Energy Solutions Unit

The Renewable Energy Solutions Unit offers high-efficiency inverters developed to provide customers with better power harvesting and longer uptime among other infrastructure related services. Solar and wind energy generation systems require inverters to convert electricity and feed it back into the grid. The Renewable Energy Solutions Unit strives to maintain flexible manufacturing operations with manufacturing and supply facilities in each of the regions it operates. RE continues to be an area of rapid growth for the company. RE's addressable global markets are the wind and solar markets representing 37 GW and 19 GW of installed capacity, respectively. In general, the business line's growth is tied to the growth of the broader solar market, strategic positioning in select geographies and various end market penetration (e.g., commercial/residential).

Figure 142: Power-One Product Portfolio



Source: Company Website

Inverters for solar energy generation:

- String Inverters: The various 300 watt to 30 kW string inverters are designed to serve small residential and commercial photovoltaic installations. These inverters, in size order, are branded as Aurora Micro, Aurora Optimizer, Aurora Uno, and Aurora Trio.
- Central Inverters: The Aurora commercial-grade central inverters are generally deployed for large solar applications such as industrial facilities, field installations, and large buildings. These inverters range from 50 kW to 1.4MW and are branded as Aurora Lite, Aurora Plus, and Aurora Ultra.
- Station Turnkey Solution: The Aurora Station, at least a 1MW inverter, allows for large turnkey installation for customers seeking a prefabricated weather-sealed cabin for installation on a field. The major benefit of this product is its high power-low space ratio and its ability to be customized to client specifications.
- Vision: Its vision business is a new line of software systems for the purpose of online and offline viewing of performance data. Their products are branded as Aurora Universal, Aurora Environmental, and EVO Easy Control.

Inverters for wind energy generation

- Aurora wind inverters are designed to harvest high levels of energy due to high conversion efficiencies. Power's inverter for the large wind power market, LSWI 2.5 MW wind inverter, has a high power density and an associated conversion efficiency of 98.5%.

The Power Solutions Unit

The Power Solutions Unit focuses on AC-to-DC and DC-to-DC power conversion products. It provides converters and network power systems for data center applications, including routers, data storage, servers, wireless communications, and optical networking. The Power Solutions Unit maintains manufacturing centers in Asia and Europe to efficiently supply the high volume demand out of those markets. Power Solutions' addressable markets are servers, storage and networking (SSN), industrial transportation (IND) and network power systems (NPS) worth $4.4 billion, $3.6 billion, and $3.0 billion respectively.

- Embedded Power: Power-One offers efficiency, densities and digital control which can reduce power consumption in a system. This equipment can also decrease over-all size and provide cost savings to customers. The embedded power products range from AC-DC, AC and DC Hot-Swap Front-Ends, Compact PCI, Embedded DC-DC, and Rugged DC-DC.
- Network Power Systems: With over 20 years of experience in network power systems under its belt, Power has been able to establish products that provide high-efficient, high-density and low-cost power solutions for the telecommunications industry. The network power systems' products entail power systems, outdoor systems, rectifiers and converters, controllers, telecom inverters and a proprietary PowCom software to manage the system.
- Market-Specific Solutions: Market-specific solutions are classified into SSN and IND products. These products facilitate SSN and IND operations from a power-generation, cost, and efficiency perspective. Power offers strategic licensing of its digital intellectual property to power supply companies including Texas Instruments, Infineon and Ericsson and currently has 10 outstanding.

We believe the Power's Power Solutions unit is largely tied to IT spending and is thus a CDP plus grower.

Management Team

Members of Power-One's senior management team are relatively new following the reorganization of the company's strategy and vision in 2008.

- **Richard Thompson:** Mr. Thompson joined Power-One as CEO in February 2008 during the restructuring of management. Before joining, Mr. Thompson served as a member of its Board of Directors. Prior to his involvement with Power, Mr. Thompson served as the Senior VP of Finance and CFO of American Power Conversion Corp. Before that, Mr. Thompson served as CFO, Secretary and Treasurer of Artesyn Technologies.
- **Gary R. Larsen**: Mr. Larsen joined Power-One in August 2010 as the Senior Vice President of Finance and CFO. Before joining, Mr. Larsen most recently served as the CFO of AuthenTec, a provider of security identity management and touch control solutions. Prior to joining AuthenTec, Mr. Larsen served as CFO of Artesyn Technologies and Artesyn's Controller before that.
- **Alexander Levran**: Dr. Levran has served as Chief Technology Officer since 2007 and became President of Renewable Energy Solutions SBU in 2010. Dr. Levran previously served as the Executive Vice President and Chief Technology Officer of Magnetek whose Power Electronics Group was acquired by Power-One in 2006. Dr. Levran is a Director of the Power Sources Manufacturers Association.
- **Neil Dial**: Mr. Dial joined Power-One in October 2008 as the Senior Vice-President of Operations. Prior to joining the company, Mr. Dial served as the Vice President of North American Operations at Plexus Corp., an electronic manufacturing service provider. Mr. Dial also held senior positions at Dell Computer, Adflex Solutions, Motorola and Texas Instruments.
- **Steve Hogge**: Mr. Hogge joined the company in July 2010 during its development of SBUs as the President of Power Solutions SBU. Mr. Hogge held several senior positions

at Cooper Industries including VP and General Manager of its Electronic and Transportation units as well as Managing Director of Cooper Bussman's Asia Pacific operations. Prior to his time at Cooper, Mr. Hogge also held several senior management positions at Bourns and Raychem Corp.

- **Tina D. McKnight**: Ms. McKnight has served as Secretary and General Counsel at Power-One since 2008. Prior to that, she served as Senior Vice President and General Counsel of BCBG Max Azria Group. Before that, she held the same position at Magnetek.

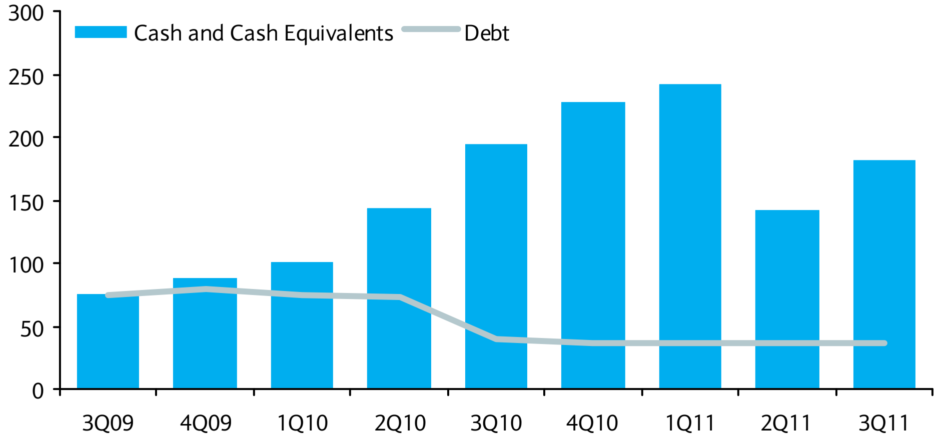
PWER – Investment Outlook

Capital Structure

We believe Power-One has comparatively one of the better balance sheets in our coverage universe.

Power-One's capital structure is less likely to be a material concern for investors as the company has a healthy balance sheet. The company has a relatively low total debt balance of $36 million and strong cash position of $183 million. We expect to see Power-One use its cash on R&D spend to develop its technology to take some market share away from leader SMA.

Figure 143: Power-One Capital Structure ($ mn)



Source: Barclays Capital, Company Reports

Estimates and Valuation

Power-One's business is highly tied to the broader solar installation market, and thus cannot be completely divorced from the near-term malaise impacting the sector. Management's fairly broad near-term sales guidance of $220-250 for 4Q11 highlights the near-term uncertainty, with limited visibility on demand trends in Germany and broader Europe. Therefore, visibility on growth revenues is fairly modest. Moreover, while we expect gross margin to modestly improve as the company improves upon inefficiencies in its manufacturing operations, we recognize that the company is investing in its business to reap key geographies in order to capitalize on the next wave of solar installs, thus potentially dampening near-term operating leverage. Moreover, with annual pricing declines in the 10%-plus area (management guided to 2012 ASP declines of high single digits to low double digits), the company will have to significantly grow its non-Europe business in order to offset pricing declines to drive overall top-line growth. This doesn't mean that Power-One can't get there. For example, the company is set to deliver close to 100MW to India this year, up materially from virtually nothing in 2010. We just think that this shift will take time.

We therefore set out 2012 sales estimates of $998 million, modest growth of 2% over 2011, with year-over-year growth not really returning until the back half of the year. For 2013, we expect an improved growth outlook of 8% to $1,081 million in sales as opportunities in the United States and Asia materially take hold.

From a margin perspective, we model steady improvement in the company's gross margin, though fluctuations are likely to take place dependent on top-line progression. In the near term, we expect the bottom-line impact to be in part offset by increased investment in expanding its geographic footprint to position the company for longer-term sales opportunities. We thus look for $0.68 and $0.78 in 2012 and 2013 EPS, respectively.

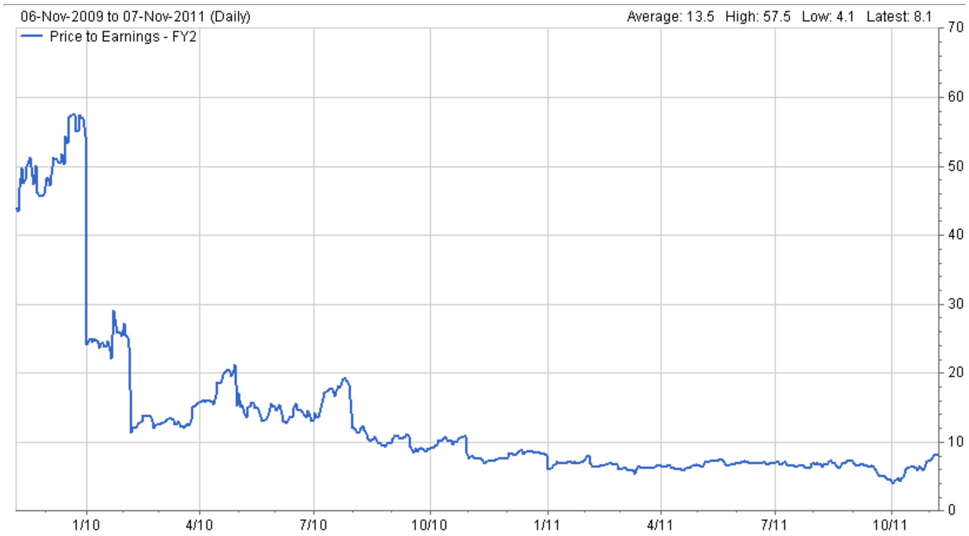
Figure 144: Inverters: Comparables Companies Analysis

($ in millions except per share data)											Calendar Year Trading Multiples								
		Price as of	Market	Firm	Calendar Year Sales			Calendar Year EPS			Price to Sales			EV / Sales			PE		
Company	Ticker	11/7/11	Capitalization	Value	2011E	2012E	2013E	2011E	2012E	2013E	2011E	2012E	2013E	2011E	2012E	2013E	2011E	2012E	2013E
SOLAR: Inverters																			
Satcon Technology	SATC	0.96	114.8	113.4	216.8	284.4	339.1	(0.31)	0.01	0.07	0.5	0.4	0.3	0.5	0.4	0.3	NM	NM	13.7
SMA Technology	S92-ETR	43.44	2,079.9	1,492.1	1,746.8	1,739.7	2,041.8	7.62	7.25	6.50	1.2	1.2	0.7	1.2	1.2	0.7	7.9	8.3	9.2
										MEAN	0.9	0.8	0.5	0.9	0.8	0.5	7.9	8.3	11.5
										MEDIAN	0.9	0.8	0.5	0.9	0.8	0.5	7.9	8.3	11.5
										HIGH	1.2	1.2	0.7	1.2	1.2	0.7	7.9	8.3	13.7
										LOW	0.5	0.4	0.3	0.5	0.4	0.3	7.9	8.3	9.2
SOLAR																			
Canadian Solar	CSIQ	3.06	133.2	963.0	1,874.3	1,811.6	1,996.3	(0.23)	(0.01)	0.05	0.1	0.1	0.5	0.5	0.5	0.5	NM	NM	NM
China Sunergy	CSUN	1.00	44.5	298.1	620.2	571.8	691.5	(0.80)	(0.10)	0.17	0.1	0.1	0.4	0.5	0.5	0.4	NM	NM	5.9
JA Solar	JASO	2.03	347.1	564.1	1,792.2	1,724.9	1,716.6	0.33	0.30	0.27	0.2	0.2	0.3	0.3	0.3	0.3	6.2	6.8	7.5
JinkoSolar	JKS	8.55	203.8	911.7	1,290.6	1,267.4	1,445.0	4.36	1.40	3.13	0.2	0.2	0.6	0.7	0.7	0.6	2.0	6.1	2.7
LDK Solar	LDK	3.82	572.2	3,385.9	2,568.5	2,459.4	3,358.2	0.25	0.04	1.10	0.2	0.2	1.0	1.3	1.4	1.0	15.3	NM	3.5
ReneSola	SOL	2.26	196.4	519.0	1,069.0	948.5	867.3	0.40	0.13	0.30	0.2	0.2	0.6	0.5	0.5	0.6	5.7	17.4	7.5
SunPower	SPWRA	9.00	901.5	1,261.3	2,787.0	3,226.9	3,608.2	0.72	1.03	0.98	0.3	0.3	0.3	0.5	0.4	0.3	12.5	8.7	9.2
Trina Solar	TSL	7.83	621.7	716.5	2,358.7	2,300.8	2,577.2	1.31	0.96	1.46	0.3	0.3	0.3	0.3	0.3	0.3	6.0	8.2	5.4
Yingli Solar	YGE	3.73	598.2	1,768.3	2,429.0	2,460.6	2,699.1	0.79	0.32	0.33	0.2	0.2	0.7	0.7	0.7	0.7	4.7	11.7	11.3
										MEAN	0.2	0.2	0.5	0.6	0.6	0.5	7.5	9.8	6.6
										MEDIAN	0.2	0.2	0.5	0.5	0.5	0.5	6.0	8.4	6.7
										HIGH	0.3	0.3	1.0	1.3	1.4	1.0	15.3	17.4	11.3
										LOW	0.1	0.1	0.3	0.3	0.3	0.3	2.0	6.1	2.7
Power-One	**PWER**	**5.47**	**863.2**	**716.5**	**981.6**	**998.7**	**1,080.9**	**0.82**	**0.68**	**0.78**	**0.9**	**0.9**	**0.7**	**0.7**	**0.7**	**0.7**	**6.6**	**8.0**	**7.1**

Source: Barclays Capital, FactSet. Estimates for non-covered companies are from FactSet.

Power-One shares (PWER) are currently trading at 7x our CY13 EPS estimate, and at a discount to market leader SMA Solar Technology (SMA). We believe a modest discount is warranted, given the latter's larger scale and modestly higher gross and higher operating margins. On a historical basis, like most vendors in the solar space, Power-One is trading near recessionary lows.

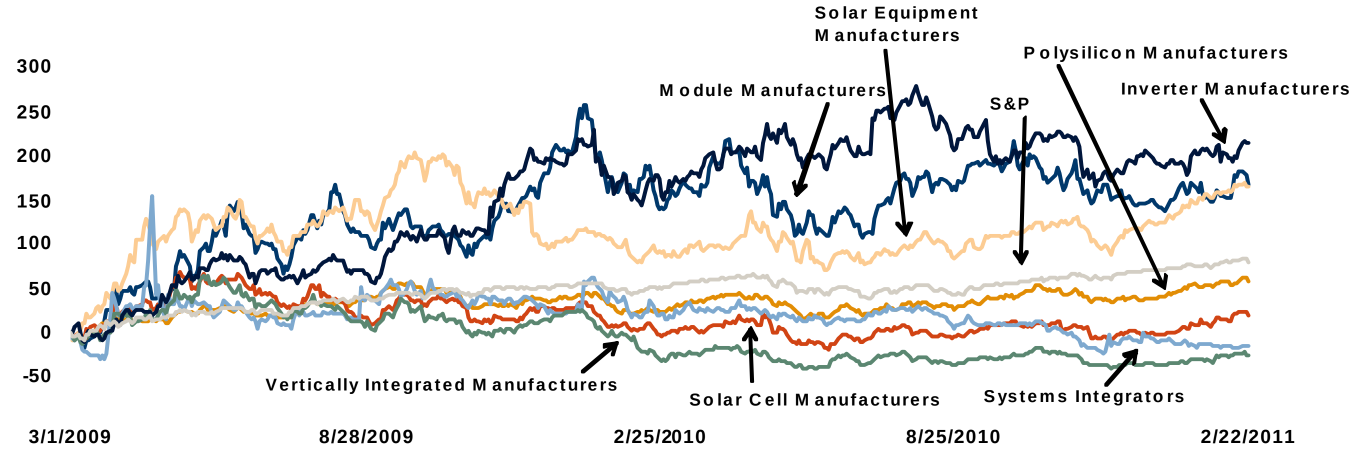
Figure 145: Power-One's Two-Year FY2 P/E Trading Range



Source: FactSet

While we recognize that Power-one cannot divorce itself from the near-term headwinds of the solar market, we believe that the inverter market is poised to execute comparatively better against a tougher broader solar environment. Moreover, we continue to believe that the inverter market as a whole has higher technological differentiation vs. other areas in solar. As highlighted below, when the market bottoms, we believe that inverter players such as Power-One should once again be able to outperform other parts of the food chain similar to trends during the market's recovery from March 2009 – February 2011.

Figure 146: Solar Industry Relative Price Performance



Source: Barclays Capital, FactSet

Note: Polysilicon Manufacturers: LDK, OCI, Shin-Etsu, Sino-American, SOL, Sumco, Tokuyama, Topco, WCH, WFR

Solar Cell Manufacturers: CSUN, ENER, ErSol, E-Ton, ESLR, FSLR, JASO, Motech, Q-Cells, SPWRA, STP

Module Manufacturers: Aleo Solar, CSIQ, Solar-Fabrik, Solarfun, Solartron, Solon

System Integrators: CMH, Centrosolar, Conergy, Solarstrom, Sunways

Vertically Integrated Manufacturers: REC, Solar World, TSL, YGE

Solar Equipment: BTUI, Centrotherm, GTAT, Manz Automation, Meyer Burger, Oerlikon, Roth & Rau, SPIR

Inverter Manufacturers: PWER, SATC, SMA

We establish a PWER price target of $7 or 9x our CY13 EPS estimate of $0.78. In line with the company's FY2 trading range for a majority of the year, and approximately in line with SMA Solar's trading range. We note that ex-cash of just north of $1 a share, our price target equates to roughly a 7x multiple.

GT ADVANCED TECHNOLOGIES (GTAT; 2-EW/2-NEU); PRICE TARGET $9

GTAT

Stock Rating
2-EQUAL WEIGHT

Sector View
2-NEUTRAL

Price Target
USD 9.00

Price (08-Nov-2011)
USD 8.00

Potential Upside/Downside
+12%

GT Advanced Technologies Inc.(GTAT): Quarterly and Annual EPS (USD)

	2011	2012			2013			Change y/y	
FY Mar	Actual	Old	New	Cons	Old	New	Cons	2012	2013
Q1	0.11A	N/A	0.41A	0.41A	N/A	0.40E	0.43E	273%	-2%
Q2	0.28A	N/A	0.29A	0.29A	N/A	0.40E	0.43E	4%	38%
Q3	0.46A	N/A	0.06E	0.29E	N/A	0.41E	0.48E	-87%	583%
Q4	0.41A	N/A	0.78E	0.65E	N/A	0.45E	0.47E	90%	-42%
Year	1.26A	N/A	1.53E	1.60E	N/A	1.66E	1.79E	21%	8%
P/E	6.4		5.2			4.8			

Source: Barclays Capital
Consensus numbers are from Thomson Reuters

COMPANY SNAPSHOT

GT Advanced Technologies U.S. Clean Technology and Renewables

Income statement ($mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	899	996	1,073	1,098	6.9%
EBITDA	283	304	328	325	4.7%
EBIT	273	287	308	304	3.7%
Pre-tax income	271	282	308	308	4.4%
Net income	175	197	216	215	7.2%
Reported EPS ($)	1.24	1.53	1.66	1.65	9.9%
Diluted shares (m)	141	129	130	131	-2.4%
Dividend per share ($)	-	-	-	-	NA

Margin and return data (%)					Average
EBITDA margin	31.5	30.6	30.6	29.6	30.6
EBIT margin	30.4	28.8	28.7	27.7	28.9
Pre-tax margin	30.1	28.3	28.7	28.0	28.8
Net margin	19.4	19.8	20.1	19.6	19.7
ROIC	-436	215	-3101	2658	-166
ROA	15.5	12.8	12.6	11.6	13.1
ROE	86.5	47.7	34.3	25.5	48.5

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	54	88	100	112	27.1%
Intangible fixed assets	108	208	208	208	24.4%
Cash and equivalents	363	421	718	855	33.1%
Total assets	1,126	1,540	1,707	1,860	18.2%
Short and long-term debt	120	100	82	19	-46.2%
Other long-term liabilities	804	1,026	996	997	7.4%
Total liabilities	924	1,127	1,077	1,015	3.2%
Net debt/(funds)	(242)	(320)	(636)	(837)	NA
Shareholders' equity	202	413	629	845	61%
Change in working capital	-	-	-	-	NA
Operating cash flow	252	177	348	233	-2.5%
Capital expenditure	31	41	32	33	1.8%
Free cash flow	242	236	380	-	NA

Valuation and leverage metrics					Average
P/E (x)	6.4	5.2	4.8	4.9	5.3
EV/EBITDA (x)	3.1	2.3	1.2	0.6	1.8
FCF yield (%)	21.5	22.9	36.6	0.0	20.2
Price/sales (x)	1.3	1.0	1.0	1.0	1.1
Price/BV (x)	5.6	2.5	1.7	1.2	2.7
Dividend yield (%)	0.0	0.0	0.0	0.0	0.0
Total debt/capital (%)	37.3	19.5	11.5	2.2	17.6

Selected operating metrics					
Photovoltaic Business	740.1	414.8	250.8	275.7	-28.0%
YOY growth	296%	-44%	-40%	10%	
Polysilicon Business	143.6	241.2	210.8	216.1	14.6%
YOY growth	-60%	68%	-13%	3%	
Sapphire Business	15.3	340.0	611.4	606.0	241%
YOY growth	0%	2121%	80%	-1%	

Source: Company data, Barclays Capital, Estimates are for GTAT's Fiscal Year

Stock Rating	2-EQUAL WEIGHT
Sector View	2-NEUTRAL
Price (08-Nov-2011)	$ 8.00
Price Target	$ 9.00
Ticker	GTAT

Investment case

While GT's shares highly discount a recovery in the company's business, limited new order growth expectations keep us on the sidelines, and thus our 2-EW rating. Our $9 price target equates to ~6x our CY13 EPS estimate of $1.65.

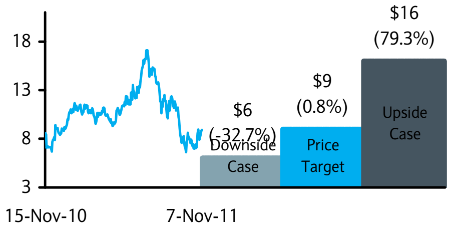
Upside case **$16.00**

Faster than expected adoption of its MonoCast technology, and potential share gains could lead to a stronger than expected 2H CY12 and CY13. Assuming stable GMs and some operating margin growth yields an upside of $2.00 in CY13. Multiple expansion to ~8x

Downside case **$6.00**

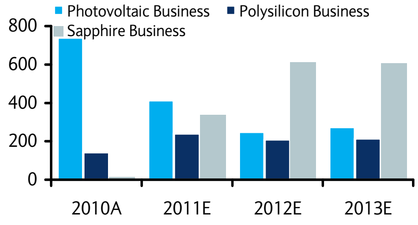
A prolonged decline in solar demand and slower adoption of LEDs could yield further declines in sales and the bottom line due to lower overhead absorption and likely continued investing in R&D. Multiple compression (~5x) to our downside outlook of $1.20 yields $6 in a downside case.

Upside/downside scenarios



Source: FactSet

Revenues by Segment



Note: FY end Dec.

GT Advanced Technologies (GT) – Initiating Coverage at 2-EW

We initiate coverage of GT Advanced Technologies Inc. (GTAT) with a 2-Equal weight/2-Neutral rating and a price target of $9. Overall, we consider GT Advanced Technologies as a leading provider of substrate material and production equipment for the solar industry and an emerging player in the LED market. We believe the company's consistent focus on improving its technology in order to support the dual mandate of improving yields while reducing total production costs for its customers is a key differentiator in the market. Given overcapacity in GTAT's markets (both solar and LED), we believe the need for better yields, higher quality materials and improved efficiency are even more critical, as the company's customers look to optimize profitability given the limited near-term growth opportunities in near-term market demand. Moreover, we consider GTAT's relatively higher visibility business model (the company has more than $2 billion in backlog as of the end of its September quarter) and 40%-plus gross margin a standout in the clean technology and renewables space. Moreover, at roughly 5x our CY13 EPS estimate of $1.31, the company's shares seem to be highly discounting any recovery in the company's business.

Our caution — and thus our 2-Equal Weight rating — largely originates from broader issues around end-market demand, which are reflected in the company's new-order declines over the last several quarters. As management indicated in the company's September quarter results, the PV market downturn has been much more severe and prolonged than anticipated, while LED and sapphire end-market growth has been slower than assumed. In both cases, polysilicon and sapphire prices continue to drop faster than expected, and though this could lead to improved adoption rates over the longer term, in the near term end-market demand is likely to remain challenged. The company also doesn't seem to be expecting any near-term growth in its orders, thus suggesting that its revenues are largely going to be driven by backlog conversion. Longer term, we believe the expansion of its market including MonoCast solutions and ultimately leveraging its Confluence Solar acquisition should enable ongoing differentiation in its solution suite. However, we look for stabilization in order flow and visibility on potential order recovery before getting more positive on the shares, given the challenged industry backdrop.

Our 2012 estimates reflect expectations for ongoing tepid demand for the company's PV and sapphire businesses (in line with our market expectations) before a modest recovery in 2H13. Our fiscal 2013 sales/EPS estimates are $1,073mn/ $1.66. For fiscal 2014 we look for sales and EPS of $1,098mn/$0.165, respectively. Our price target of $9 equates to approximately 6x our CY13 EPS estimate of $1.65, broadly in line with solar peers.

Company Description

Founded in 1994 and headquartered in Merrimack, New Hampshire, GT Advanced Technologies (GT) is a global provider of substrate material and production equipment for both the solar and LED industry. Through its proprietary technology, GT provides polysilicon production technology and multicrystalline/monocrystalline ingot growth systems to the solar industry, as well as sapphire growth systems and material for the LED market.

Previously known as GT Solar, the company’s recent name change to GT Advanced Technologies reflects the underlying strategic shift completed by the company in recent years. Primarily through acquisitions, GT broadened its addressable market in targeting additional opportunities beyond its historical focus on the multicrystalline technologies for the solar industry.

The company's growth strategy is driven by a combination of internal investment in order to improve its reactor technology (i.e., combined improvements in throughput and lower total cost of ownership for its customers) and inorganic investment. GT now provides a product portfolio of primarily three technology segments: polysilicon production equipment, photovoltaic (PV) silicon casting furnaces, and sapphire production equipment and materials.

The solar arm of its business supplies upstream manufacturers in the PV supply chain. GT offers major PV manufacturers polysilicon production technologies used to develop high purity polysilicon, an essential raw material used to manufacture cells. The company is also the world's largest manufacturer of casting furnaces used to produce solar wafers by crystallizing polysilicon into ingots.

Since its acquisition of Crystal Systems in July 2010, GT has also developed core competencies in the field of crystallizing sapphire materials for several other specialty markets including medical, research, aerospace and defence. GT provides upstream sapphire manufacturing equipment and sapphire materials to the LED industry seeking particularly large substrate sizes.

GTAT – Investment Positives

A Key Supplier in the Solar and LED Market

GT Advanced Technologies is a leading supplier in the solar market, and an emerging supplier to the LED industry. With respect to the former, the company serves as a core supplier of equipment to upstream solar vendors. Through its recent acquisition of Crystal Systems, the company has further expanded its addressable market to areas such as sapphire furnace equipment for LEDS leveraging its core technology know-how and management's ability to commercialize acquired assets. We therefore believe the company is well positioned to capitalize on the long-term growth opportunities within both industries.

High Level of Visibility

GT has a high level of visibility in its business. Currently, the company has $2.1 billion of backlog. Approximately 43% originates from its poly business, 12% from its PV business and 45% from its sapphire business. The total backlog profile is composed of 22% of deferred revenue, 14% of non-refundable customer deposits, 5% of letters of credit, and 59% of unshipped orders.

Efficiency Through an Outsourced Manufacturing Model

GT outsources the bulk of its components used in its PV and sapphire equipment and the manufacturing of its polysilicon equipment. Components are shipped from qualified vendors to the customer's installation site, helping to minimize inventory costs. Additionally, this outsourced model mitigates high physical plant requirements and limits the amount of manufacturing employees, thereby providing a highly efficient operating model.

Innovation Drives Ongoing Enhancements

GT continues to focus its internal R&D efforts on driving ongoing improvements in both yield and reduced power consumption of its equipment. Given the current pricing and cost reduction requirements throughout both the solar and LED food chain, we believe consistent innovation is necessary for the company to remain a core supplier to both of its end markets. For example, GT improved its annual silicon output per reactor by a factor of four from 100 metric tons to 400 plus metric tons since 2007. The company reduced its reactor's power consumption by over 50% since 2007 levels.

GTAT – Investment Risks

Market Overcapacity

We believe the solar and LED markets are in a period of consolidation and thus experience a high level of over capacity. While GT's solid technology portfolio and ongoing strategic initiative to help drive cost out of each market's manufacturing process should enable the company to weather near-term challenges, end market instability is likely to be a challenge for at least the near term.

Conversion of Backlog

With the current economic climate, potential customers may experience delays or defaults on the terms of their contracts. Additionally, contract modifications can result in extended delivery schedules or price concessions. As a result, such contracts in order backlog may not generate margins equal to GT's historical operating results.

Inability to Commercialize Technology

GT considers its ability to commercialize new technologies at affordable prices one of its key competitive advantages. The large capital requirement to acquire, develop, or manufacture new technologies, poses a significant risk to GT's balance sheet. In the solar sector, manufacturers are looking for two main qualities in their panels: high cell efficiency and low cost in an effort to make solar generated electricity more price competitive with electricity generated from traditional sources. Any new scalable technology that produces polysilicon or sapphire more efficiently and cheaper has the potential to make GT's proprietary technology obsolete. Moreover, even if GT develops the most competitive technology in the market, making it scalable and realizing profits is still a challenge. We believe that the primary purpose of its two most recent acquisitions, Crystal Systems and Confluence Solar, is to broaden GT's revenue stream by commercializing proprietary technologies.

Our View

Overall, we consider GT Advanced Technologies as a leading provider of substrate material and production equipment for the solar industry and an emerging player in the LED market. We believe the company's consistent focus on improving its technology to support the dual mandate of improving yields while reducing total production costs for its customers is a key differentiator in the market. Given overcapacity in GTAT's markets (both solar and LED), we believe the need for better yields, higher quality materials, and improved efficiency are even more critical, as the company's customers look to optimize profitability given the limited near-term growth opportunities in near-term market demand. Moreover, we consider GTAT's relatively higher visibility business model (the company has more than $2 billion in backlog at the end of its September quarter) and 40%+ gross margin a standout in the sector. Moreover, at approximately 5x our CY13 EPS estimate, of $1.31, the company's shares seem to be highly discounting any recovery in the company's business.

Our caution — and thus our 2-Equal Weight rating — largely originates from broader issues around end market demand which are reflected in the company's new order declines over the last several quarters. As management indicated in the company's September quarter results, the PV market downturn has been much more severe and prolonged than anticipated while LED and sapphire end market growth has been slower than assumed. In both cases, polysilicon and sapphire prices continue to drop faster than expected, and though this could lead to improved adoption rates over the longer term, near-term end-market demand remains challenged. The company also doesn't seem to be expecting any near-term growth in its orders, thus suggesting that its revenues are largely going to be driven by backlog conversion. Longer term, we believe the expansion of its market including MonoCast solutions and ultimately leveraging its Confluence Solar acquisition should enable ongoing differentiation in its solution suite. However, we look for stabilization in order flow and visibility on potential order recovery before getting more positive on the shares given the challenged industry backdrop.

Figure 147: GT Advanced Technologies (GTAT) Investment Framework

Market Growth Opportunity	◔	- Given market overcapacity and ongoing curbing incentives, we continue to believe there are downside risks to growth in the solar market for the duration of this year and heading into 1H12. - Additional growth will be dependent on rising contribution from new markets (e.g., the US and China) vs. traditionally strong arenas, adding to uncertainty around the ultimate trajectory of demand.
Potential for Share Gains	◕	- We consider GTAT a leading provider of production equipment and substrate material for the solar industry and an emerging player in the sapphire market. - Recent increases in its addressable market through its Confluence Solar acquisition as well as its internally developed MonoCast technology should ultimately lead to share gains for customers looking to optimize efficiency and output.
Likelihood of Margin Expansion	◔	- We see limited scope for gross margin expansion as our estimates already factor in management's targeted range in the mid-40s. - Steady investment in R&D is required in order to stay competitive, though improvement in sales should help to drive operating margin expansion, over time.
Barriers to Entry	◑	- GTAT has been a leader in its key production equipment markets due to diligent and consistent development of its core technology. - The gap with competitors has closed in recent times, though we believe that the next phase in the company's evolution should provide additional runway for further separation of its product portfolio.
Capitalization	◕	- The company remains one of the better capitalized vendors in the broader solar market given healthy operating cash generation and a stable balance sheet.
Risk Profile	◑	- We believe that GTAT's risk profile is highly correlated to the broader solar market. - While its backlog helps provide healthy near-term revenue visibility, we believe declining net orders in recent quarters is evidence of the challenged demand environment. - We clearly consider GTAT a longer-term player in the market; however, limited visibility on when orders will improve keeps us cautious in the near term.
Valuation	◑	- GTAT's shares are currently at the low end of its historical trading range as well as its peer group of the broader solar market. - While we believe that valuation is cheap, we don't expect material multiple expansion until visibility on order stabilization improves.

Source: Barclays Capital

Background

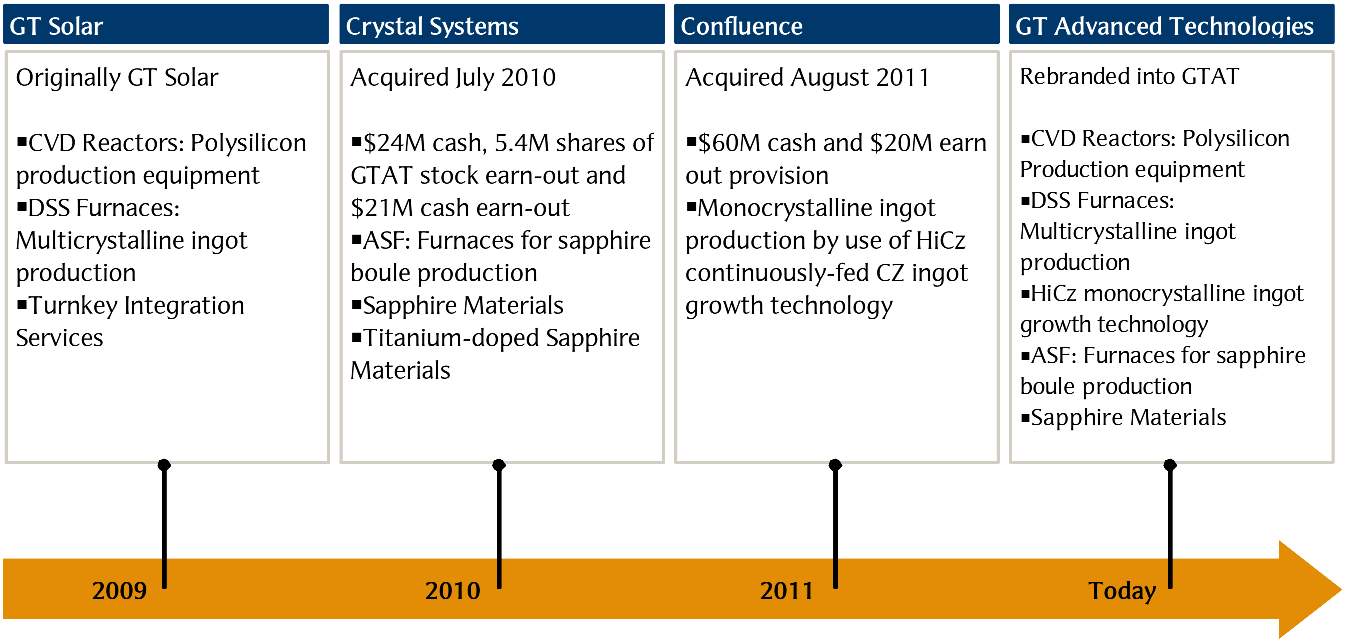
Co-founded in 1994 by Kedar Gupta and Jon Talbott as GT Solar, the company is now a global provider of polysilicon production technology and sapphire and silicon crystalline growth systems. Through its proprietary technology and subsidiaries, GT Advanced Technologies supplies upstream manufacturers in the solar and LED industries with equipment or raw materials.

GT Solar was acquired by GT Solar Holdings (a consortium of private equity investors) in 2006 before completing its initial public offering in 2008. While the company's public debut was challenging to say the least (one of its major competitors indicated that it would purchase furnaces from a key competitor one day after the pricing of the IPO), under new management, the company has reengineered its strategy in leveraging its core technology know-how in targeting a broader addressable market. The company acquired privately-held Crystal Systems in July 2010 to diversify its revenue stream to include sapphire equipment and sapphire material revenues. In August 2011, GT announced its acquisition of privately-held Confluence Solar. The recent name change to GT Advanced Technologies highlights the company's ability to provide products which support the production of monocrystalline solar ingots in addition to the company's primary focus on multicrystalline technology.

Strategic Acquisitions to Broaden the Addressable Market

The company has a history of leveraging acquisitions in order to expand its portfolio of products. Its 2005 acquisition of the DSS photovoltaic furnace and the licensing of its polysilicon CVD reactors in 2006 have since become a core part of its business. Most notably, the company has taken two important strategic steps with the acquisition of Crystal Systems in 2010 and the recently acquired Confluence in the summer of 2011 in order to further its strategy of expanding its addressable market.

Figure 148: GTAT Growth



GT Solar	Crystal Systems	Confluence	GT Advanced Technologies
Originally GT Solar	Acquired July 2010	Acquired August 2011	Rebranded into GTAT
▪CVD Reactors: Polysilicon production equipment ▪DSS Furnaces: Multicrystalline ingot production ▪Turnkey Integration Services	▪$24M cash, 5.4M shares of GTAT stock earn-out and $21M cash earn-out ▪ASF: Furnaces for sapphire boule production ▪Sapphire Materials ▪Titanium-doped Sapphire Materials	▪$60M cash and $20M earn out provision ▪Monocrystalline ingot production by use of HiCz continuously-fed CZ ingot growth technology	▪CVD Reactors: Polysilicon Production equipment ▪DSS Furnaces: Multicrystalline ingot production ▪HiCz monocrystalline ingot growth technology ▪ASF: Furnaces for sapphire boule production ▪Sapphire Materials
2009	2010	2011	Today

Source: Barclays Capital, Company Reports

Crystal Systems: Expansion into the Sapphire Market

Acquired in July 2010, Crystal Systems offered GT Advanced Technologies the opportunity to expand its revenue stream and develop a footprint in sapphire materials. Crystal Systems (CS) was established in 1971 by Fred Schmid for the purpose of advanced crystallization and related technologies. Today, the company specializes in manufacturing high-quality sapphire materials used in the LED industry and other specialty industries such as medical and aerospace. At the time of the acquisition, GT was able to provide capital-constrained CS an opportunity to grow and develop visibility to the broader industry. GT acquired Crystal Systems for $24 million in cash, 5.4 million shares of GTAT common stock in an earn-out, and $21 million cash earn-out based on particular financial and technical targets – approximately $55 million plus the earn-out.

From a strategic perspective, this acquisition offers GT a buffer against the inherent cyclicality in its other business lines. GT has a history of making technologically oriented acquisitions, like this one, and successfully commercializing the products into profit-making businesses. Management believes that the LED market is poised to grow at an accelerated rate considering the high demand for sapphire and rising substrate prices. They see many similarities between their experience in the PV market seven to eight years ago and the sapphire market today. Also, the manufacturing process associated with the advanced furnaces is comparable to construction of the DDS (directional solidification system) units and utilize similar materials affording the company the opportunity to rapidly scale technology. Management believes that Crystal Systems' customers consider its sapphire quality superior and believe yields are consistently higher than those attainable in the market, specifically from competing technologies like the Kyropoulos Method.

In March 2011, GT completed the expansion of its acquired sapphire manufacturing facility, which tripled its sapphire production capacity. Strategically, management views this plant expansion as a pilot facility, R&D center and customer demonstration center. While it currently has the demand to sell nearly 100% of its output to the LED business, GT intends to manage its relationships with non LED customers as their specialty markets place higher quality and size demands on Crystal Systems production acting as valuable technology drivers for the future. Management expects this deal to generate $40-60 million of revenue in FY '12.

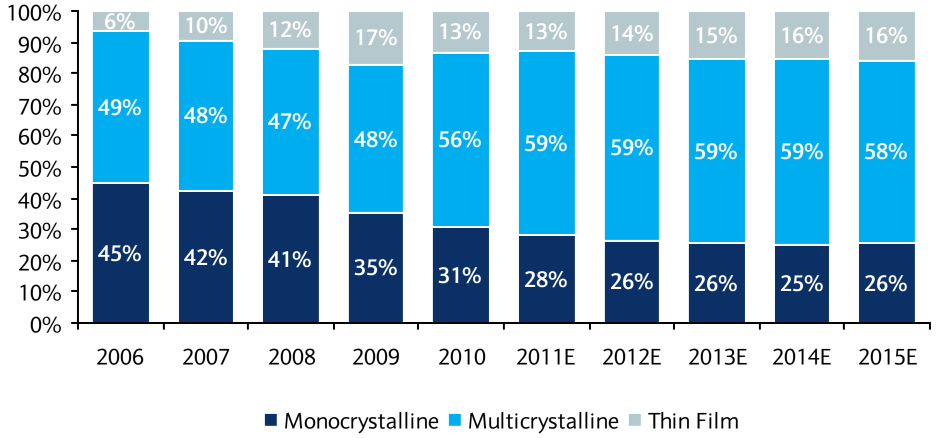
Confluence Solar: The Shift into Monocrystalline

GT is poised to be the only merchant supplier of advanced monosilicon production technology (HiCz).

Acquired in August 2011, Confluence Solar offers GT the opportunity to enter the PV mono market with proprietary technology that can further facilitate cell efficiency and cost reductions. Confluence is a venture-backed company founded in 2007. Historically, GT developed recognition as a player in the multicrystalline PV space as it has worked with some large-scale PV manufacturers to build cost-competitive operations. Like the end goal with Crystal Systems, GT aims to develop Confluence's advanced monosilicon production technology (HiCz) for merchant equipment commercialization. Because the specific technology is not yet in the marketplace, GT is poised to be the only merchant supplier of this product. GT acquired Confluence for $60 million in cash as well as a $20 million earn-out provision based on performance. This deal is expected to be accretive on an EPS basis in the second half of FY13 bringing in $60-80 million of revenue.

The market for silicon-based solar cells is split between monocrystalline and multicrystalline and is trending toward multicrystalline silicon taking share from monocrystalline silicon and thin film. In 2010, monocrystalline, multicrystalline and thin film represented 31%, 56%, and 13% of the market respectively. From an efficiency perspective, monocrystalline has outperformed multicrystalline cells because of the Czochralski (CZ) method but does come with a sizable cost premium per good kilogram of silicon produced. The price premium does not offset the more significant manufacturing cost differential. This cost disadvantage has been further highlighted by improved multi efficiencies and lower manufacturing costs. However, given the near-term challenges to the solar industry, we believe that rather than focusing on material capacity expansion, many of GT's customers will focus on yield improvement, leaving Confluence's technology attractive. Specifically, Confluence's HiCz technology enables the production of high-efficiency monocrystalline ingots at a much lower cost than traditional methods of growing monocrystalline ingots. Yielding higher cell efficiencies is critical to reaching the ultimate goal of grid parity.

Figure 149: Mono v. Multi v. Thin Film Landscape



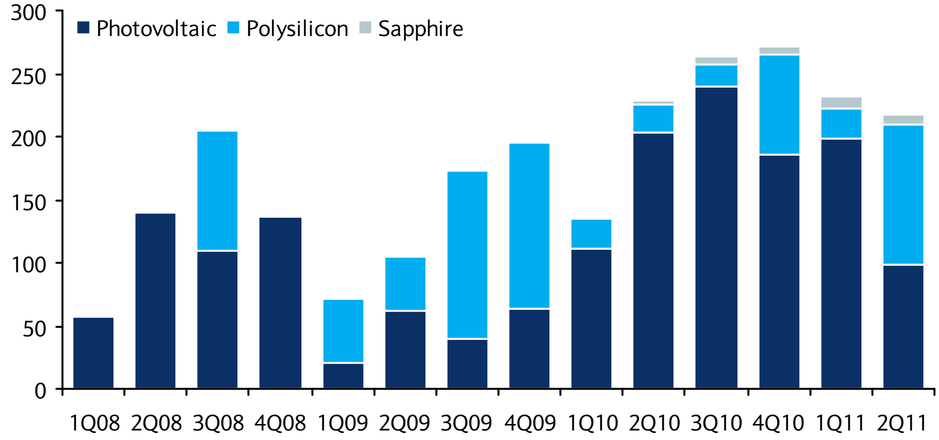
Source: Solarbuzz

GT's Product Portfolio

GT's products address two primary industries: solar and sapphire/LED. The company provides polysilicon production equipment and associated services to operate a production plant, crystalline growth furnaces to cast high quality ingots used in the production of wafers, and sapphire crystal growth equipment and materials for the LED and other special industrial markets.

GT segments its revenues into three broad businesses: photovoltaic, polysilicon and sapphire. The photovoltaic business is GT's oldest line generating 100% of revenues in 1H08. GT diversified its revenue stream with the addition of new business lines. The company began generating revenues for its polysilicon business and sapphire business in 2H08 and 2Q10, respectively.

Figure 150: GT's Revenues by Segment ($ mn)



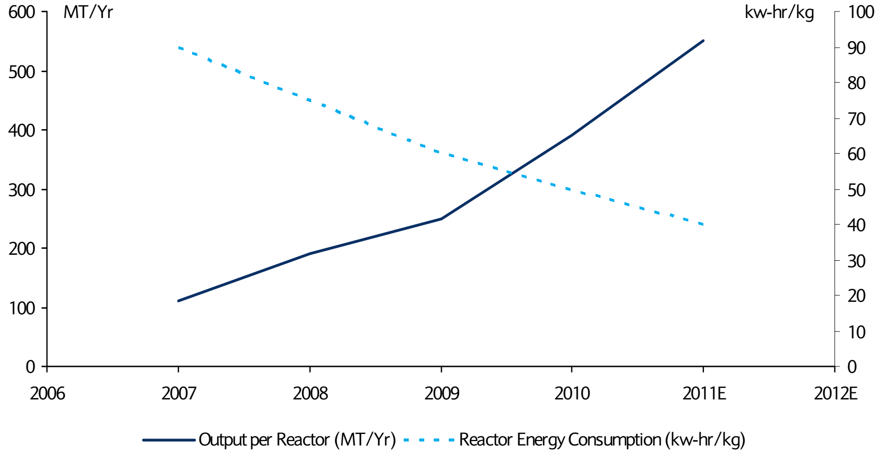
Source: Company Reports

Investment Drives Innovation

GT is currently in Beta testing with its DSS MonoCast furnaces which offer near CZ Si material performance with the advantage of a lower cost.

At the core of GT's strategy is the drive toward innovation by maximizing output while decreasing the power consumption of its products. Since 2007, the annual output per GTAT SDR CVD Reactor (MT/Yr) has increased 4x from roughly 100 MT to approximately 450 MT and associated energy consumption has decreased by 50%. On the DSS furnace side, while it offers about 1.5% less efficiency per cell, the cost per ingot growth for a traditional DSS furnace is at a considerable discount as compared to the traditional CZ furnace. GT is currently in Beta testing with its DSS MonoCast furnaces which offer near CZ Si material performance with the advantage of a lower cost.

Figure 151: Innovation Improves Performance



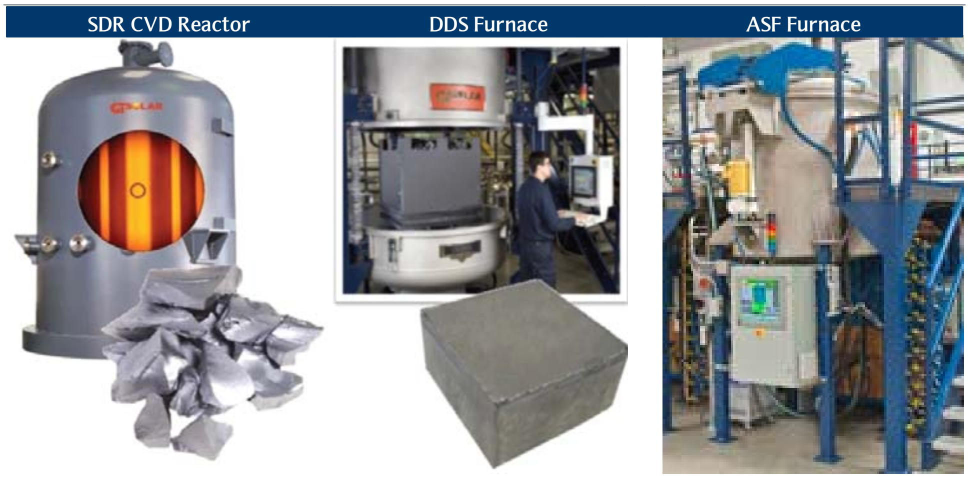
Source: Company Reports, Barclays Capital

Outsource Strategy Yields Operational Efficiency

GT outsources the bulk of its components used in its PV and sapphire equipment and the manufacturing of its polysilicon equipment. Components are shipped from qualified vendors to the customer's installation site helping to minimize inventory costs. Additionally, this outsourced model mitigates high physical plant requirements and limits the amount of manufacturing employees, thereby providing a highly efficient operating model.

The company primarily sells its products through an in-house direct sales approach, utilizing third-party providers to handle the manufacturing of its products. Final assembly of its products take place at the customer site. GT's customers are generally required to provide a non-refundable deposit upon signing a contract ahead of the delivery of its products. The company also receives cash or LOCs equivalent to up to 30% of a purchase price before shipping the equipment. The balance is paid upon receiving customer acceptance of products. This process can take as little as a couple of months to a year to complete. The company's customers include some of the largest Asia-based polysilicon, solar cell/module and solar wafer companies, including GCL Solar, LDK Solar, Trina Solar and Yingli Solar. Approximately 93% of its sales originate from Asia (China represents 71%).

Figure 152: GT's Product Portfolio



Source: Company Presentations

Polysilicon

GT Advanced Technologies provides polysilicon production equipment and associated services to operate a production plant.

- SDR CVD Reactors: GT is the market leader in chemical vapor deposition (CVD) reactors used in the production of polysilicon. GT's SDR series of reactors produce more polysilicon for the solar industry than any competing reactor. The SDR400 offers a low-maintenance process platform designed for high-volume manufacturing employing the Siemens-type process technology. Based on a GT Advanced Technology study on the average performance of CVD reactors across the entire market, GT SDR400 reactors outperform in throughput and power consumption. Over 250 SDR CVD reactors have been installed worldwide

- Trichlorosilane Production Technology Solution: GT offers a complete Trichlorosilane (TCS) technology package that improves the efficiency and lowers the cost of polysilicon production. Coupling this technology with the SDR CVD reactor and producing TCS with hydrochlorination technology reduces capital investment by 10-15% and operating costs by about 15% according to GT.

Photovoltaic Crystalline Growth Systems

GT Advanced Technologies provides crystalline growth furnaces to cast high quality ingots used in the production of wafers.

- DDS Furnaces: GT's directional solidification system (DDS) is the industry standard for crystalline growth furnaces with over 3,100 units shipped, comprising over 70% of the installed global capacity. Its newest development, the DSS650, produces larger silicon ingots translating to 44% more output and reduced consumable costs than its predecessor, the DSS450HP. The DSS650 produces the industry's largest high-volume production ingots which can reduce costs of wafer operations. The taller, larger bricks improve the performance of wafer saw beams for wafer slicing thereby minimizing waste. The furnace output is approximately 10MW per year whereas its predecessor produces approximately 8MW. GT recently announced Beta shipments and production testing of its new DSS MonoCast ingot growth technology which achieves higher cell efficiencies than its traditional DSS furnace.

Sapphire Equipment Materials

GT Advanced Technologies and GT Crystal Systems provide sapphire crystal growth equipment and materials for the LED and other special industrial markets.

- ASF: GT's advanced sapphire furnace (ASF) produces large-area sapphire substrates for markets that demand high grade sapphire material such as high brightness LED, medical and aerospace. The key benefit to this furnace is that it portrays 40 years of proven sapphire material production. The furnace is designed to optimize the heat exchanger method (HEM) technology with fully automated control and an easy-to-use system.
- Sapphire Material: The material produced within GT's facilities is known for its high purity level, low light scatter and crystalline perfection. The materials are produced in GT's new and improved manufacturing plant and sold to the LED and speciality industrial markets.

Customers: GT generally supplies polysilicon producers, solar wafer manufacturers and sapphire producers. The company also sells sapphire materials to customers in the LED market. In any given year, GT typically supplies a small number of customers in its PV and Poly business. GT supplies a number of vendors in the solar arena. Key customers, who have comprised over 10% of GT's FY revenues, include OCI, LDK Solar, Jiangsu GCL Silicon Materials Technology, Yingli New Energy Resources and Glory Silicon Energy. GT is still developing its customer base for its sapphire business and expects to target customers primarily in the Asian market.

GT competes on four major fronts: 1) technological innovation, 2) commercialization of technologies, 3) low-cost production and 4) service (both installation and aftermarket). In the polysilicon business, GT faces direct competition from a small number of companies who produce products that compete with its CVD reactor. These competitors include MSA Apparatus Construction, Centrotherm Elektrische Anlagen, Morimatsu Industry and Poly Plant Project. The company also competes with large companies that produce polysilicon for the semiconductor industry including Hemlock Semiconductor, Wacker Chemie, Tokuyama, MEMC, and Renewable Energy. In the PV business, GT competes with several emerging low-cost competitors to its DSS crystallization furnaces. The largest are two integrated manufacturers, Centrotherm and Ferrotec, with resources and scale capable of competing globally. Finally, the sapphire business faces competition primarily for the sale of sapphire materials from Rubicon Technology, Sapphire Technology, Kyocera International, Namiki Precision Jewel and Monocrystal. The company faces competition for the sale of ASF from companies offering alternative technologies including Thermal Technology and Advanced RenewableEnergy Company.

Management Team

Members of GT's management team are relatively new following the reorganization of the company's strategy in the 2008/2009 period.

- **Tom Gutierrez:** Mr. Gutierrez has served as GT's CEO since 2009 and is a member of its board of directors. Prior to joining GT, Mr. Gutierrez served as the CEO of Xerium Technologies, a multinational company that manufactures and markets technically advanced synthetic textiles. Before that, he served as the CEO of a $3 billion multinational business engaged in power control and energy storage products called Invensys. He currently holds board member positions with Veeco Instruments, Verso Paper and PhytoChem Pharmaceuticals, a company he founded.

- **Rick Gaynor:** Mr. Gaynor has served as GT's VP and CFO since 2009. Prior to joining GT, Mr. Gaynor was CFO of a voice over IP equipment and service provider, Sonus Networks. Before joining Sonus, Mr. Gaynor was the CFO at Sycamore Networks, a provider of optical networking products to telecommunications providers.

- **Hoil Kim:** Mr. Kim joined GT in 2008. He currently serves as VP, CAO, General Counsel and Secretary. Most recently, Mr. Kim headed up strategic development for Cabot Corp., a developer of a patented manufacturing method used to make platinum-based fuel cell electrocatalysts. Mr. Kim began his career at Intelsat and NASA as a telecommunications engineer.

- **Jeffrey Ford:** Joining in 2006, Mr Ford serves as GT's VP and General Manager of its Asia PV and sapphire equipment. Prior to his tenure at GT, Mr. Ford served as a general manager at Kayex, a division of SPX Corp., which develops and manufactures semiconductor and photovoltaic single crystal growing furnaces.

- **David Gray:** Mr. Gray has served as the VP of Strategic Development since 2009. Most recently, Dr. Gray headed technology M&A at Canaccord Adams. Before joining Canaccord, Dr. Gray served as a managing director and founder of the East Coast office at SVB Alliant. As a chemical engineer early in his career, he founded Aspect International, an engineering design firm focused on the development and licensing of advanced semiconductor process equipment.

- **David Keck:** Mr Keck joined GT in 2006. He currently serves as the VP and General Manager of the polysilicon division of the company. Before joining GT, Keck operated his own silicon consulting practice. Previously, he served as the VP of business development, plant manager, and operations manager, for Advanced Silicon Materials Incorporated (ASIMI). ASIMI is an established ultra-pure silicon manufacturer. Prior to ASIMI, Mr. Keck was a thermodynamics engineer at Lockheed Missiles and Space Corp.

- **Vikram Singh:** Mr. Singh serves as the VP and General Manager of the PV equipment business unit and engineering at GT. Dr. Singh led the commercialization of Plasma Doping Technology at Varian Semiconductor Equipment Associates as Senior Director of new products and business developments. Prior to Varian, Dr. Singh also led the commercialization of 300mm CVD equipment at Novellus Systems Inc.

- **Cheryl Diuguid:** Ms. Diuguid joined GT in 2011 and serves as the VP and General Manager of Sapphire Equipment and Materials. Most recently, she served as the CEO of Lumetric, a silicon start-up, where she headed the commercialization of an innovative, high-efficiency and energy-saving technology. Ms. Diuguid also built the Asian businesses at Xerium Technologies Inc. and Enersys.

GTAT – Investment Outlook

Capital Structure

GT currently has a healthy balance sheet with approximately $484 million in cash and equivalents, and roughly $393 million in net cash. The company's total debt stands at $91 million. Given healthy cash generation (in stark contrast to many of its peers in the solar sector), balance sheet concerns are unlikely to emerge as a material concern for the investor community. Additionally, in this current phase of consolidation among various players in the solar industry, GT's strong balance sheet offers it the financing necessary for broad-ending its addressable market and potentially engage in share buybacks, as suggested by management in its recent September quarter earnings call. Historically, the company used its cash to expand its product portfolio through acquisitions. We believe the company continues to look for opportunities to further diversify its business and would not discount the potential for another acquisition — one that leverages its core strengths — during this period of consolidation and rationalization.

Management Outlook/Guide

GTAT's FYQ2 (CYQ3) performance came in ahead of management's guidance as a result of solid revenue recognition in its polysilicon business. This was prompted by strong order flow in the pipeline from large orders including polysilicon manufacturer OCI's order for GTAT's latest generation 5 SDR reactor. We believe, and as was confirmed by management on the call, cost reduction and cell efficiency improvement efforts are likely to drive demand for GTAT's upgraded furnaces. The real question, however, is whether the desire to upgrade, with specifically GTAT furnaces, is enough to offset the global decrease in demand. In our view, while demand is likely to persist, overall oversupply in the polysilicon market and macroeconomic concerns regarding global demand will slow the upgrade cycle to better and more efficient furnaces as vendors absorb capacity . The sapphire business remained flat q/q as the large chunk of shipments and associated revenue is expected in FYQ4 (CY 1Q13). Management did note that some revenue may be recognized in the sapphire business in the back end of the company's third quarter. Finally, the PV business was down 51% q/q primarily because of the industry downturn yielding additional push-outs to 2013. Operationally, management closed the Confluence deal this quarter for its PV business and is currently in the process of delivering samples of its High CC mono material. Management adjusted down full year guidance by about 5% to reflect the downturn in the PV business.

The company revised its FY12 revenue guidance to $950 million to $1.0 billion from its previous range of $1.0-$1.1 billion. However, the company does expect to maintain gross margin in its 43-45% range. As previously mentioned, management guided down to account for the industry downturn in the PV business as a result of significant push-outs of PV deliveries into FY13, which will, however, be partially offset by management's expectations of higher ASF and polysilicon equipment revenue in FY12. This equates to PV representing 40%, Poly representing 25%, and Sapphire representing 35% of FY12 revenues. For the upcoming quarter, fiscal 3Q, management guided that it is likely to generate the lowest revenues, in the range of $140-155 million with margins in the range of 36-38%, for the fiscal year primarily because most of the PV push-outs will come out of Q3 and sapphire and poly upside will be realized in Q4. Management boldly noted that FYQ4 is positioned to be the strongest quarter in the company's history generating.

As for the company's backlog, management indicated that it is confident with its current level backlog, at $2.1 billion, which is enough to meet revenues for an entire year. Management expects growth from its polysilicon business as large polysilicon manufacturers will need to upgrade existing equipment in order to compete on cost and efficiency. In addition, in order to offset any near-term concerns in the PV business, management expects the sapphire business to perform well considering the completion of the company's Salem factory in the first quarter and its commencement of ASF furnace shipments. The company did, however, recognize that new order trends are likely to remain muted, thus suggesting for the near term its top line is highly dependent on drawing down its backlog.

Estimates and Valuation

Our 2012 estimates reflect ongoing tepid demand for the company's PV and sapphire businesses (in line with our market expectations) before a modest recovery in 2H FY13. Our fiscal 2013 sales/EPS estimates are $1,073mn/$1.66. For FY14 we look for sales and EPS of $1,098mn/$0.165 respectively. Our price target of $9 equates to approximately 6x our CY13 EPS estimate of $1.65, broadly in line with solar peers.

FIRST SOLAR INC. (FLSR; 2-EQUAL WEIGHT/2-NEU); PRICE TARGET $52

FSLR

Stock Rating
2-EQUAL WEIGHT

Sector View
2-NEUTRAL

Price Target
USD 52.00

Price (08-Nov-2011)
USD 47.55

Potential Upside/Downside
+9%

First Solar Inc.(FSLR): Quarterly and Annual EPS (USD)

	2010	2011			2012			Change y/y	
FY Dec	Actual	Old	New	Cons	Old	New	Cons	2011	2012
Q1	2.00A	N/A	1.33A	1.33A	N/A	1.54E	1.56E	-33%	16%
Q2	1.84A	N/A	0.70A	0.70A	N/A	1.79E	1.74E	-62%	156%
Q3	2.04A	N/A	2.25A	2.25A	N/A	2.16E	2.13E	10%	-4%
Q4	1.80A	N/A	2.74E	2.78E	N/A	2.46E	2.47E	52%	-10%
Year	7.68A	N/A	7.05E	7.16E	N/A	7.94E	7.81E	-8%	13%
P/E	6.2		6.7			6.0			

Source: Barclays Capital
Consensus numbers are from Thomson Reuters

COMPANY SNAPSHOT

First Solar U.S. Clean Technology and Renewables

Income statement ($mn)	2010A	2011E	2012E	2013E	CAGR
Revenue	2,564	3,279	4,261	4,667	22.1%
EBITDA	905	925	1,059	1,111	7.1%
EBIT	749	703	829	859	4.7%
Pre-tax income	762	715	832	862	4.2%
Net income	664	618	707	733	3.3%
Reported EPS ($)	7.68	7.05	7.94	8.23	2.3%
Diluted shares (m)	86	88	89	89	1.0%
Dividend per share ($)	-	-	-	-	NA

Margin and return data (%)					Average
EBITDA margin	35.3%	28.2%	24.9%	23.8%	28.0
EBIT margin	29.2%	21.4%	19.5%	18.4%	22.1
Pre-tax margin	29.7%	21.8%	19.5%	18.5%	22.4
Net margin	25.9%	18.8%	16.6%	15.7%	19.3
ROIC	22.3%	15.3%	15.0%	13.7%	16.6
ROA	15.2%	10.0%	10.2%	9.5%	11.2
ROE	19.2%	14.5%	14.2%	12.8%	15.2

Balance sheet and cash flow ($mn)					CAGR
Tangible fixed assets	1,751	2,294	2,878	3,478	25.7%
Intangible fixed assets	433	459	459	459	1.9%
Cash and equivalents	766	914	893	1,004	9.4%
Total assets	4,380	6,202	6,940	7,715	20.8%
Short and long-term debt	237	608	608	608	36.8%
Other long-term liabilities	688	1,324	1,355	1,398	26.6%
Total liabilities	925	1,932	1,963	2,006	29.4%
Net debt/(funds)	(528)	(306)	(285)	(395)	NA
Shareholders' equity	3,455	4,270	4,977	5,709	18.2%
Change in working capital	57	450	137	13	-39.4%
Operating cash flow	705	426	793	962	10.9%
Capital expenditure	589	849	814	852	13.1%
Free cash flow	1,352	1,238	1,614	1,824	0.0%

Valuation and leverage metrics					Average
P/E (x)	6.2	6.7	6.0	5.8	6.2
EV/EBITDA (x)	4.0	4.2	3.7	3.5	3.8
FCF yield (%)	32.9	29.7	38.1	43.1	36.0
Price/sales (x)	1.6	1.3	1.0	0.9	1.2
Price/BV (x)	1.2	1.0	0.9	0.7	0.9
Dividend yield (%)	0.0	0.0	0.0	0.0	0.0
Total debt/capital (%)	6.4	12.5	10.9	9.6	9.9

Selected operating metrics					CAGR
Total Modules	2185.165	2478.601	3164.93	3267.168	14.3%
YoY Growth	11%	13%	28%	3%	
EPC	378.35	800.49	1096.5	1400	54.7%
YoY Growth	275%	112%	37%	28%	

Source: Company data, Barclays Capital

Stock Rating	2-EQUAL WEIGHT
Sector View	2-NEUTRAL
Price (07-Nov-2011)	$ 47.55
Price Target	$ 52.00
Ticker	FSLR

Investment case

Despite being a best in class module manufacturer/systems provider, we believe it will be difficult for FSLR to separate from broader industry challenges. We are 2-EW until visibility on stabilization or strategy improvements. Our price target of $52 represents a multiple of ~6x our CY13 EPS estimate of $8.23.

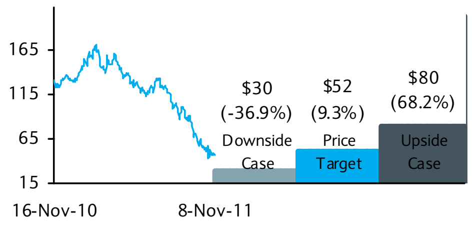
Upside case $ 80.00

A steady recovery in demand led by new market growth (U.S. and China) starting in 2H12 coupled with stabilizing margins could support an upside case of $10 in earnings in 2013. Coupled with modest multiple expansion (~8x) suggests an upside case of $80 a share.

Downside case $ 30.00

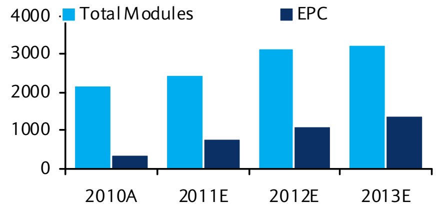
Ongoing pricing pressure, and diminished technology differentiation could further impact First Solar's outlook yielding a potential downside earnings case of $6.00 a share. Assuming further multiple contraction (~5x) yields a downside case of $30 a share.

Upside/downside scenarios



Source: FactSet

Revenues by Segment



Note: FY end Dec.

First Solar (FSLR) – Initiating Coverage at 2-EW

We initiate coverage of First Solar (FSLR) with a 2-Equalweight/2-Neutral rating and a price target of $52. Overall, we consider First Solar a best in class solar module manufacturer and systems provider. The company's leading production capabilities and lowest cost modules have enabled the company to emerge a leader in the space. However, despite our belief that First Solar will survive our expectations of further rationalization of the solar industry (bolstered by its 2.7 GW systems business pipeline), we believe too much uncertainty clouds our visibility on the potential trajectory of the business in both the near and mid-term. This uncertainty is at both the industry (pace of solar deployments, impact of pricing reductions across the solar value chain, and competitive landscape), and company level (recent departures of senior management over the last few quarters include a surprising departure of the company's CEO a few weeks ago). Based on commentary emerging from the company's recent 3Q earnings call, we believe First Solar's management acknowledges these challenges, and thus we look for improved visibility on First Solar's strategy for navigating the near-term challenges of the solar industry. In the meantime, we prefer to remain on the sidelines.

Our estimates for 2012 and 2013 reflect ongoing growth in First Solar's components and systems business, offset in part by continue module ASP and cost declines. Our 2013 sales and EPS estimates are $4.3 billion and $7.94, respectively, while we look for sales and EPS of $4.7 billion and $8.23 in 2013. Our price target of $52 reflects a peer multiple of 6x our CY13 EPS estimate of $8.23. While we continue to believe that First Solar is well positioned to survive the expected industry shakeout, we believe material multiple expansion is unlikely for at least the near term until visibility on the trajectory of the broader industry improves.

Company Description

Headquartered in Tempe, Arizona, First Solar was founded in 1990 and rebranded as First Solar (FSLR) in 1999. The company is a leading manufacturer of photovoltaic (PV) solar modules and integrated solar systems that produce renewable electricity. First Solar's historical strength stems from its advanced technology. Considered the largest manufacturer of thin film–based solar modules, FSLR was able to manufacture solar panels that achieved the lowest manufacturing cost per watt vs. other competitors. This provided the company with a first mover advantage in the market as solar systems installation gained momentum. At the core of its strategy is the combination of: 1) ongoing investment in its core technology, and 2) expansion of its capacity in order to remain cost competitive with silicon- and/or polysilicon-based module manufacturers. According to the company, in addition to its low cost, First Solar's PV technology has the smallest carbon footprint with the fastest energy payback time when measured on a life-cycle basis.

For its PV module manufacturing business, First Solar uses its proprietary thin-film technology. Effectively, thin-film technology allows suppliers to manufacture lower cost and highly flexible panels compared to other technologies. Combined with First Solar's highly automated manufacturing process, the company has been able to provide some of the lowest cost modules in the solar market. However, the erosion of spot poly prices is making multi- and mono-panels more price competitive. Critics of thin-film technology contend it lacks proven scalability despite FSLR's success in the market.

For its utility-scale PV systems business, First Solar offers turn-key PV power plants that can be either ground-mounted or in commercial/industrial rooftop applications. First Solar has manufacturing plants in Ohio, Arizona, Germany, Vietnam, and Malaysia. First Solar's production capacity has grown from 25 MW in 2005 to an expected 2.24 GW for 2011, primarily driven by manufacturing expansion in Malaysia. FSLR can build out a new facility in 12-15 months due to its factory replication process.

Investment Positives

Low-Cost Solutions Provider

First Solar has been one of the lowest-cost providers in the solar industry along with its fully integrated Chinese competitors for several years. The driver for it ability to manufacture panels at a discount to industry averages is largely due to its use of thin-film technology (as opposed to historically expensive polysilicon) and its robust manufacturing process. We believe that as polysilicon prices come down and energy providers seek efficiency before cost, First Solar may lose some of the edge that it currently holds in the market.

Largest Scale

First Solar expects to have 2.25 GW of capacity online through 2011 which is 11% of our global 2012 demand forecast. First Solar has the largest production capacity compared to its two primary integrated competitors Ying Li Solar and Trina Solar hosting capacities of 1.7 GW and 1.9 GW, respectively. An emerging theme in the solar industry is "less-than-efficient" capacity among tier-2 and tier-3 players. First Solar's manufacturing is notable as it is entirely uniform across every plant due to its automated manufacturing process.

End-to-End Solutions Strategically Sound

In the current solar climate, upstream manufacturers of polysilicon and wafers experience lower margins as polysilicon prices come down. Having a strong position in downstream markets at module production and panel instalment can hedge against any upstream challenges. In addition, end-to-end solutions offer clarity to both sides of the business in and around supply and demand.

FSLR – Investment Risks

Highly Competitive Market

First Solar operates in a highly competitive market filled with low-cost providers where being a cost-leader isn't enough. With polysilicon prices falling and technologies improving, the integrated solar manufacturers' key differentiator is efficiency and balance sheet strength. Also, many vendors originate from China where they have been incentivized with government support in the form of grants and awards that enable them to lower price points below economically viable levels. FSLR must continue to out-innovate its competition in order to ensure value differentiation as opposed to just relying on its ability to drive low cost products.

High Industry Dependence on Government Subsidies

Broadly, the solar industry has experienced high levels of growth in the past few years due to the support of various governments (e.g., Spain and Germany). Much of this support has been due to feed-in tariffs that enable renewable electricity generation to compete with legacy fossil fuel sources. Changes to these programs/initiatives could emerge as a headwind for the greater industry, particularly as module manufacturers must continue to drive down cost in order to achieve grid parity. For First Solar in particular, the company's sales to Europe are contracted among a few large customers, and the company's business could be negatively impacted in a declining incentive environment.

Diminishing DOE Financing/Normalized PPAs could Pressure Margins

First Solar's near-term margins should continue to be supported by favorable PPA contracts set up in the 2008-09 timeframe. With expirations beginning in the 2012 period, normalized PPA prices coupled with diminishing DOE financing could increase pressures on First Solar's margin structure. The company still holds industry leading gross margins at approximately 38% vs. peers in the 20-30% range. However, as vendors continue to compete on pricing and normalized PPA terms materialize, potential downside pressure could emerge.

Shift in Management Underscore Uncertainty

We believe the recent shift in management (Robert Gillette, then CEO, departed in late October; Jens Meyerhoff, then President of Utility Systems, departed in August; and Bruce Sohn, then COO, resigned in April) highlights the uncertainties listed above. We are especially concerned with the recent unexpected announcement of Mr. Gillette's departure and believe this could be a reflection of First Solar's inability to compete following its diminishing financing/normalized PPAs.

Our View

Overall, we consider First Solar a best in class solar module manufacturer and systems provider. The company's leading production capabilities and lowest cost modules have enabled the company to emerge a leader in the space. However, despite our belief that First Solar will survive our expectations of further rationalization of the solar industry (bolstered by its 2.7 GW systems business pipeline), we believe too much uncertainty clouds our visibility on the potential trajectory of the business in both the near and mid-term. This uncertainty is at both the industry (pace of solar deployments, impact of pricing reductions across the solar value chain, and competitive landscape), and company level (recent departures of senior management over the last few quarters include a surprising departure of the company's CEO a few weeks ago). Based on commentary emerging from the company's recent 3Q earnings call, we believe First Solar's management acknowledges these challenges, and thus we look for improved visibility on First Solar's strategy for navigating the near-term challenges of the solar industry. In the meantime, we prefer to remain on the sidelines.

Figure 153: First Solar (FSLR) Investment Framework

Market Growth Opportunity	◔	- Given market overcapacity and ongoing curbing incentives, we continue to believe there are downside risks to growth in the solar market for the duration of this year and heading into 1H12. - Additional growth will be dependent on rising contributions from new markets (e.g., the U.S. and China) vs. traditionally strong arenas, adding to uncertainty around the ultimate trajectory of demand.
Potential for Share Gains	◑	- Overall, we expect share from thin-film providers to remain fairly flattish within the scope of the overall solar industry. - While FSLR remains a best-in-class operator, our principle concerns on share positioning reflect potential share shifts due to material module pricing declines for traditional crystalline technologies.
Likelihood of Margin Expansion	◔	- First Solar's margins are likely to remain stable in the near term, though potential concerns arise from the expiration of PPA contracts set up in 2008-09 as well as diminishing DOE financing influencing the cost of a system build.
Barriers to Entry	◑	- First Solar's proprietary thin-flim technology remains the industry leader in terms of cost. - Moreover, the company's size and scale make it the largest production capacity vs. other integrated players in the market. - Headwinds include diminishing cost/benefits as traditional crystalline solution prices have materially declined in recent quarters closing the gap in terms of cost/performance.
Capitalization	◑	- First Solar has a healthy capital structure; however, growing activity in the company's systems business also increases the need for working capital. - Though the company receives upfront payments for select projects, financing is still required, increasing its working capital requirements which thus bear monitoring.
Risk Profile	◑	- In our view, First Solar has the scale, near-term cost advantage, and balance sheet to make it through the market shake-out. - Our principle concern is, given declining prices of traditional crystalline solutions, whether or not its technology advantages will provide as strong a competitive differntiator in the next few years as they have in the prior few.
Valuation	◑	- First Solar's shares trade roughly in line with its peers in the broader solar market. - We believe multiple expansion will be dependent on the company's ability to retain technology leadership, continue to expand its scale in a strategic manner, and secure attractive financing for systems project developments.

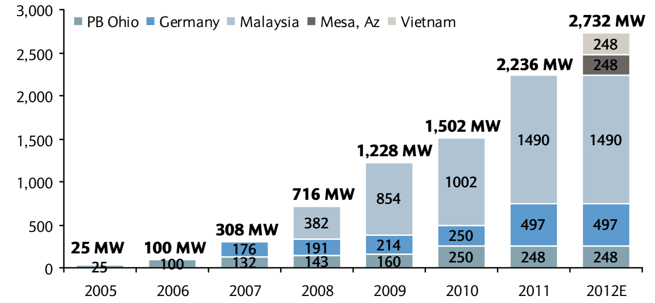
Source: Barclays Capital

Background

Originally called Solar Cells Inc., First Solar was founded in 1990 by Harold McMaster with a vision to manufacture low-cost, thin-film cells with scalability using cadmium telluride (CdTe) based PV modules. Generally, solar cells become less efficient at converting absorbed energy to electricity as their cell temperatures increase. However, First Solar's CdTe cells are less affected than traditional silicon-based cells by temperature increases making them more efficient. In addition, CdTe also converts diffuse and low light to electricity more efficiently than conventional cells making them more effective in inclement weather. In 1999, the company was sold to True North Partners, owned by the Walton family of Wal-Mart, and rebranded as First Solar. First Solar completed its initial public offering in November 2006.

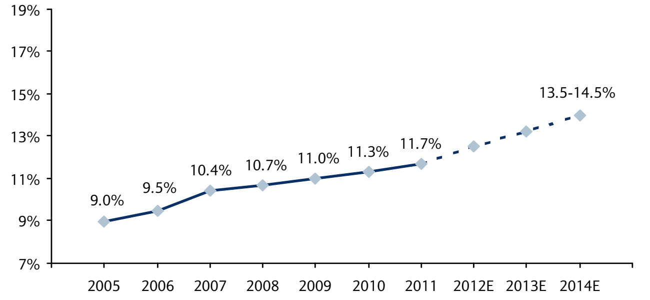
Products and Services

Figure 154: Production Capacity Growth



Source: Company Reports

Figure 155: Module Conversion Efficiency



Source: Company Reports

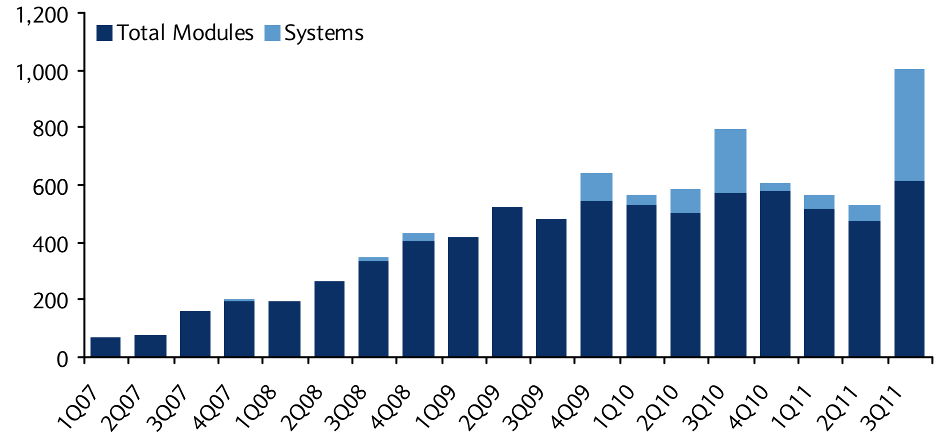
First Solar developed its business around three major pillars: CdTe thin film technology that fosters low-cost manufacturing supplemented with standardized capacity expansion. First Solar specializes in PV modules with an advanced thin-film semiconductor process, the only tier-1 integrated manufacturer to principally use this technology, which reduces manufacturing costs as compared to traditional crystalline silicon PV modules. Thin-film panels are manufactured by depositing a layer of semiconductor or non-semiconductor material on a flexible substrate-like glass. Thin-film solar panels represent less than 15% of the entire market.

The CdTe thin-film panels enable First Solar to be a low-cost manufacturer by combining adequate efficiency (although not the best in the market) and lower module pricing (fostered by improving module efficiencies, increased throughput, increased plant scale, cost-conservation, and low cost locations). Additionally, thin-film technology doesn't make use of the historically expensive polysilicon. Although poly spot prices have come down in recent quarters, if prices were to rebound, First Solar's use of low-cost CdTe may make its modules more attractive in the marketplace. Finally, First Solar's robust internal manufacturing, discussed in detail later in this section, allows for aggressive capacity expansion through an automated process.

First Solar aims to reach a conversion efficiency of 13.5% to 14.5% by 2014 and currently stands at roughly 11.7%. The National Renewable Energy Laboratory confirmed a 17.3% FSLR cell efficiency in 2Q11 and recognized CdTe as having the potential for achieving the lowest production cost among thin film technologies. The manufacturing cost per watt for this technology at FSLR is currently 0.75 $/w down from 1.08 $/w in 2008. FSLR announced its goal of reaching 0.52-0.63 $/w by 2014.

Products

Figure 156: FSLR Revenue Breakdown



Source: Company Reports

- **PV Modules (Components)**: With over 3.8 GW of working installations, First Solar leads the industry in the PV module manufacturing market using thin film technology. The FS Series 2 PV module was the first module to break the $1 per watt manufacturing cost barrier. In 2010, FSLR released the FS Series 3 module offering higher efficiencies and lower module voltages among other technical advantages. All First Solar PV modules outperform crystalline silicon modules with the same power ratings and have an associated conversion efficiency of 11.8% and cost $0.74 per watt to manufacture. The components business was largely First Solar's entire revenue stream until 2010.

- **Utility Scales PV Systems:** First Solar provides utility-scale PV system solutions including project development, financing, asset sale, engineering, procurement and construction (EPC), and operations and management (O&M) over the life of any given system. The company offers on-grid systems for utilities, IPPs (Independent power producers), generating companies and utility-scale project developers. First Solar also develops integrated applications off the grid for smaller distributed generation requirements. The company currently has the largest PV project pipeline in North America of 2.4 GW. This business hasn't materially impacted First Solar's revenue stream until 2010. However, with the addition of several project portfolios with relationships to utilities, First Solar has been able to generate more revenues for this business.

Figure 157: Rooftop

Source: Company Reports.

Figure 158: Ground Mount

Source: Company Reports

Services

While products make up the majority of First Solar's revenue stream, the company offers services associated with its modules and PV systems. FSLR offers engineering, procurement and construction (EPC) services for managing site designs, construction permitting, commissioning and data monitor installations. The acquisition of RayTracker contributed to this business line. Additionally, FSLR serves its clients with operations and maintenance services post PV plant construction to maximize their energy harvest.

Internal Manufacturing

First Solar's robust manufacturing system completes all the steps in the solar value chain from semiconductor deposition to final assembly and testing in an automated continuous process that reduces costs. The entire process from a piece of glass to a completed solar module takes less than 2.5 hours. It is this process that enables replication and rapid expansion of FLSR capacity. Copy Smart, the proprietary replication process, enables FSLR to develop future manufacturing facilities that mirror existing facilities to ensure consistency in production and product. FSLR expects manufacturing capacity to be at 2.24 GW by the end of 2011 and averages 12-15 months to rollout a new facility.

Acquisitions

First Solar continues toward diversifying its business from simply being a moderate manufacturer toward enhancing its downstream position by building a systems business that can provide utility-scale solar projects for markets where there is potential for long-term sustainable growth. First Solar has made several strategic acquisitions over the course of several years to add megawatts to its project portfolio pipeline and develop new and lasting relationships with utilities.

Turner Renewable Energy: Developing an Inorganic Pipeline

In November 2007, First Solar acquired Turner Renewable Energy, a developer of commercial solar power projects, for $34.3 million paid in a combination of cash and stock. Turner Renewable Energy was formerly called DT Solar before entrepreneur Ted Turner invested in the company. Turner designed and deployed commercial solar projects for utilities and large companies since 2004. This acquisition lay the foundation for First Solar as it began acquiring project pipelines.

OptiSolar: Expanding its Inorganic Pipeline

First Solar completed its acquisition of OptiSolar's PV project pipeline in April 2009. One of the projects acquired in this deal was the 550 MW Topaz solar development project (which was recently denied a DOE loan) that held a PPA deal with PG&E. The deal also transferred a project pipeline of 1.3 GW that was in negotiation with utilities out in the West for solar development projects as well as strategic land rights of approximately 136,000 acres. FSLR paid Optisolar $400 million in an all-stock transaction.

Edison Mission Group: Private Land Development

First Solar acquired a portion of Edison Mission Group's (EMG) solar project development pipeline in California and the Southwest in January 2010. The pipeline contained projects largely on private land ranging from 20 MW to 150 MW as opposed to public land, like many of First Solar's projects. Like Turner and Optisolar, this too was an inorganic acquisition to improve First Solar's project pipeline.

NextLight Renewable Power: Courting PG&E

In July 2010, First Solar completed its acquisition of NextLight Renewable Power, a developer of solar power projects. This acquisition was another step in the company's expansion into the U.S. utility-scale power market, which began with its acquisition of Turner followed by Optisolar and Edison Mission Group. NextLight, when it was acquired, had PPAs for more than 520 MW with Pacific Gas & Electric (PG&E), one of the largest utilities in the United States. This proved to be an important step in developing a strong relationship with PG&E, which First Solar lacked prior to this. First Solar paid $285 million for NextLight and its pipeline.

RayTracker: Improvements to Thin Film Efficiency

First Solar acquired RayTracker, a tracking technology and PV balance-of-systems firm, for more efficient project development and construction in January 2011. This team was acquired to join FSLR's Engineering, Procurement, and Construction group. The purpose of this acquisition was to improve FSLR's project development and deployment operations. Tracking systems are used to keep solar panels following the sun's movements thereby increasing output from solar panels. Tracking technology could prove to be useful for FSLR as it continues to use thin-film technologies that convert less sunlight into electricity than polysilicon based modules.

Management Team

First Solar's management team is comprised of industry veterans from a host of different industries including utilities, diversified manufacturing, technology and aerospace defence to name a few.

- Michael Ahearn: Mr. Ahearn currently serves as the Chairman of the Board and Interim Chief Executive Officer of First Solar. Mr. Ahearn previously served as chief executive officer from August 2000 to September 2009 and executive chairman from October 2009 to December 2010. Mr. Ahearn is currently Chairman and Managing Partner of True North Venture Partners, venture capital firm focused on investments in the energy, water, agriculture and waste sectors. Prior to his role at First Solar, he was partner and president of an equity investment firm, JWMA (formerly True North Partners, L.L.C.).

Prior to joining JWMA, Mr. Ahearn practiced law as a partner in the firm of Gallagher & Kennedy.

- **TK Kallenbach:** Mr. Kallenbach joined First Solar in 2009 and currently serves as the President of its Components Business. Formerly, Mr. Kallenbach headed First Solar's Marketing and Product Management organization. Like Mr. Gillette, Mr. Kallenbach joined First Solar from Honeywell Aerospace. He held various leadership positions including VP of Marketing & Product Management, VP of Engineering and Technology for its Aerospace Electronics Group, Defense & Space Electronic Systems, and Propulsion Engines and Systems, and VP of Business Aviation, Director of HTF7000 Propulsion System, and Director of Helicopter Engines.

- **James Brown:** Mr. Brown joined First Solar in 2008 as the VP of Project Finance. In 2011, he was appointed President of its Utility Systems Business Group and currently fills that seat. Prior to joining, Mr. Brown worked in finance holding positions with Chase Manhattan, Societe Generale, WestLB and HSBC. Mr. Brown began his career as a Helicopter Pilot and Troop Commander in the U.S. Army Air Cavalry.

- **David Eaglesham:** Mr. Eaglesham joined First Solar in 2006 serving as the VP of Technology. He was then promoted to Chief Technology Officer in 2009. Before that, Mr. Eaglesham served as Chief Technologist at Lawrence Livermore and Director of Advanced Technologies at Applied Materials. Prior, he spent time on semiconductor deposition techniques and doping as Director of Electronic Device Research at Bell Labs.

- **Mark Widmar**: Mr. Widmar recently joined First Solar in April 2011 as the company's CFO. Prior to this position, Mr. Widmar served as the CFO for Graftech International and President of Graftech's Engineering Solutions business. Before that, Mr. Widmar worked as Corporate Controller for NCR. Prior to his role as Controller, he was a Business Unit CFO for NCR setting the financial strategy for the company. In the earlier stages of his career, Mr. Widmar held various managerial positions with Dell, Lucent Technologies, AlliedSignal and Bristol Myers/Squibb.

- **James Zhu**: Mr. Zhu serves as First Solar's Chief Accounting Officer but joined the company as VP Corporate Controller in June 2007. Prior to joining First Solar, Mr. Zhu served as the Assistant Controller and VP Corporate Controller for Salesforce.com. Before that, Mr. Zhu held positions at Chiron including Associate Director and Accounting Manager and KPMG before that.

FSLR – Investment Outlook

Estimates and Valuation

Our estimates for 2012 and 2013 reflect ongoing growth in First Solar's components and systems business, offset in part by continue module ASP and cost declines. Our 2013 sales and EPS estimates are $4.3 billion and $7.94, respectively, while we look for sales and EPS of $4.7 billion and $8.23 in 2013. Our price target of $52 reflects a peer multiple of 6x our CY13 EPS estimate of $8.23. While we continue to believe that First Solar is well positioned to survive the expected industry shakeout, we believe material multiple expansion is unlikely for at least the near term until visibility on the trajectory of the broader industry improves.

APPENDIX – FINANCIAL MODELS

Figure 159: AONE – Historical and Projected Income Statement

($ millions except per share data)	Mar-10 1Q	Jun-10 2Q	Sep-10 3Q	Dec-10 4Q	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-08 FY	Dec-09 FY	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE
INCOME STATEMENT																						
Total Revenues	**24.5**	**22.6**	**26.2**	**24.0**	**18.1**	**36.4**	**64.3**	**50.4**	**79.9**	**91.7**	**96.1**	**109.9**	**115.2**	**133.6**	**144.0**	**162.7**	**68.5**	**91.0**	**97.3**	**169.1**	**377.6**	**555.5**
% Growth - QoQ	-0.3%	-7.6%	16.0%	-8.4%	-24.7%	100.9%	76.9%	-21.7%	58.7%	14.7%	4.9%	14.4%	4.8%	16.0%	7.8%	13.0%						
% Growth - YoY	5.4%	14.7%	11.1%	-2.1%	-26.0%	60.8%	145.3%	109.7%	341.7%	152.1%	49.4%	118.2%	44.1%	45.8%	49.8%	48.0%	-25.2%	33%	6.9%	73.8%	123.3%	47.1%
Cost of Revenue:	26.5	25.6	29.3	33.4	33.6	53.9	83.9	62.8	91.0	101.6	102.1	113.0	113.9	128.1	133.8	146.5	80.8	93.7	114.8	234.1	407.7	522.3
of which is unabsorbed manufacturing costs	*4.9*	*4.8*	*5.0*	*5.9*	*9.5*	*5.3*	*5.0*	*5.0*	*4.0*	*4.0*	*3.0*	*2.0*	-	-	-	-		*21.7*	*20.6*	*24.8*	*13.0*	-
Gross Profit (loss)	(2.0)	(2.9)	(3.1)	(9.4)	(15.5)	(17.5)	(19.6)	(12.4)	(11.0)	(9.9)	(6.0)	(3.1)	1.2	5.5	10.2	16.2	(12.2)	(2.7)	(17.4)	(65.0)	(30.1)	33.2
Operating expenses																						
Research and Development	14.1	13.8	16.0	16.8	20.4	17.4	19.2	19.4	19.0	16.7	18.4	19.1	20.1	19.7	20.1	21.1	37.0	48.3	60.7	76.3	73.2	80.9
Sales and Marketing	2.8	3.4	3.5	4.4	4.1	5.1	4.5	4.6	4.3	4.2	4.6	4.6	4.7	4.8	4.7	4.7	8.9	8.5	14.1	18.2	17.7	18.8
General and Administrative	8.2	8.8	9.9	9.1	9.1	9.4	16.3	16.3	15.6	15.8	16.0	15.2	15.5	15.8	15.9	15.3	21.5	24.5	36.1	51.1	62.5	62.4
Production start-up	1.8	3.6	11.8	3.9	4.6	3.5	1.1	4.6	3.0	3.0	2.0	1.0	1.0	1.0	1.0	1.0	-	1.5	21.1	13.8	9.0	4.0
Total Operating Expenses	27.0	29.6	41.1	34.2	38.2	35.4	41.1	44.8	42.0	39.7	41.0	39.8	41.2	41.2	41.7	42.0	67.3	82.7	132.0	159.5	162.5	166.1
Operating Income / (Loss)	**(29.0)**	**(32.6)**	**(44.2)**	**(43.6)**	**(53.7)**	**(52.9)**	**(60.7)**	**(57.2)**	**(53.0)**	**(49.6)**	**(47.0)**	**(42.9)**	**(40.0)**	**(35.7)**	**(31.4)**	**(25.8)**	**(79.6)**	**(85.4)**	**(149.4)**	**(224.5)**	**(192.5)**	**(132.8)**
Less Stock Based Compensation	2.5	2.6	3.2	3.4	3.3	3.4	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.5	8.6	11.8	14.4	16.0	16.0
Impairment Charge						2.6														2.6	-	-
Adjusted EBIT	**(26.5)**	**(29.9)**	**(41.0)**	**(40.2)**	**(50.4)**	**(49.5)**	**(57.0)**	**(53.2)**	**(49.0)**	**(45.6)**	**(43.0)**	**(38.9)**	**(36.0)**	**(31.7)**	**(27.4)**	**(21.8)**	**(75.1)**	**(76.9)**	**(137.6)**	**(210.1)**	**(176.5)**	**(116.8)**
Adjusted EBITDA	**(22.8)**	**(25.9)**	**(36.5)**	**(35.4)**	**(45.4)**	**(41.1)**	**(49.4)**	**(48.7)**	**(42.6)**	**(39.2)**	**(36.3)**	**(32.4)**	**(29.0)**	**(25.0)**	**(20.2)**	**(15.3)**	**(66.9)**	**(63.7)**	**(120.6)**	**(184.7)**	**(150.4)**	**(89.5)**
Interest income								0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1				0.1	0.2	0.3
Interest expense, net	(0.2)	(0.4)	(0.2)	(0.5)	(0.6)	(2.1)	(2.2)	(2.5)	0.1	(2.6)	0.1	(2.6)	0.0	(2.6)	0.0	(2.6)	0.4	(1.0)	(1.3)	(7.5)	(5.0)	(5.1)
(Loss) gain on foreign exchange	0.2	(1.2)	0.7	(0.3)	0.2	0.1	(0.1)										(0.7)	0.7	(0.6)	0.2	-	-
Unrealized loss on preferred stock warrant	-	-	-	-	-	-	-										(0.3)	(0.5)	-	-	-	-
Other income	-	-	0.1	(0.9)	1.0	(0.4)	(0.1)										-	-	(0.8)	0.5	-	-
Other income (expense), net	0.0	(1.6)	0.6	(1.7)	0.6	(2.4)	(2.5)	(2.4)	0.2	(2.5)	0.1	(2.6)	0.0	(2.5)	0.1	(2.5)	(0.6)	(0.9)	(2.7)	(6.8)	(5.0)	(4.8)
Pretax Income / (Loss)	(29.0)	(34.2)	(43.6)	(45.3)	(53.1)	(55.3)	(63.1)	(59.7)	(52.8)	(52.1)	(46.9)	(45.5)	(39.9)	(38.1)	(31.3)	(28.3)	(80.2)	(86.3)	(152.1)	(231.3)	(197.5)	(137.7)
Provision for income taxes	0.1	0.1	0.1	0.5	0.4	0.1	0.6	-	-	-	-	-	-	-	-	-	0.3	0.3	0.8	1.1	-	-
Net income / (loss)	**(29.1)**	**(34.3)**	**(43.7)**	**(45.8)**	**(53.5)**	**(55.4)**	**(63.7)**	**(59.7)**	**(52.8)**	**(52.1)**	**(46.9)**	**(45.5)**	**(39.9)**	**(38.1)**	**(31.3)**	**(28.3)**	**(80.4)**	**(86.6)**	**(152.9)**	**(232.4)**	**(197.5)**	**(137.7)**
Less: Net loss attributable to the noncontrolli	0.1	0.1	0.1	0.2	0.0	-	-	-	-	-	-	-	-	-	-	-	(0.0)	0.8	0.4	0.0	-	-
Net income / (loss) attributable to A123	**(29.0)**	**(34.2)**	**(43.7)**	**(45.7)**	**(53.4)**	**(55.4)**	**(63.7)**	**(59.7)**	**(52.8)**	**(52.1)**	**(46.9)**	**(45.5)**	**(39.9)**	**(38.1)**	**(31.3)**	**(28.3)**	**(80.5)**	**(85.8)**	**(152.6)**	**(232.3)**	**(197.5)**	**(137.7)**
Accretion of preferred stock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(0.0)	(0.0)	-	-	-	-
Net loss attributable to common stockholders	**(29.0)**	**(34.2)**	**(43.7)**	**(45.7)**	**(53.4)**	**(55.4)**	**(63.7)**	**(59.7)**	**(52.8)**	**(52.1)**	**(46.9)**	**(45.5)**	**(39.9)**	**(38.1)**	**(31.3)**	**(28.3)**	**(80.5)**	**(85.8)**	**(152.6)**	**(232.3)**	**(197.5)**	**(137.7)**
Net loss per share attributable to common sto	**(0.28)**	**(0.33)**	**(0.42)**	**(0.43)**	**(0.51)**	**(0.44)**	**(0.51)**	**(0.47)**	**(0.41)**	**(0.41)**	**(0.36)**	**(0.35)**	**(0.31)**	**(0.29)**	**(0.24)**	**(0.21)**	**(9.04)**	**(2.55)**	**(1.46)**	**(1.92)**	**(1.54)**	**(1.05)**
Weighted average number of common shares o	103.3	104.3	104.7	104.4	105.5	124.5	126.0	126.8	127.5	128.3	129.0	129.8	130.5	131.3	132.0	132.8	8.9	33.7	104.4	120.7	128.7	131.7
Margin Analysis																						
Gross Margin	-8.3%	-13.0%	-11.7%	-39.0%	-85.5%	-48.2%	-30.4%	-24.7%	-13.8%	-10.8%	-6.3%	-2.8%	1.1%	4.1%	7.1%	10.0%	-17.9%	-3.0%	-17.9%	-38.4%	-8.0%	6.0%
Gross Margins (ex unabsorbed costs)	11.7%	8.2%	7.3%	-14.5%	-33.0%	-33.6%	-22.7%	-14.7%	-8.8%	-6.5%	-3.2%	-1.0%	1.1%	4.1%	7.1%	10.0%	-17.9%	20.9%	3.2%	-23.8%	-4.5%	6.0%
Sales and Marketing	11.4%	14.9%	13.4%	18.5%	22.6%	13.9%	7.0%	9.1%	5.4%	4.6%	4.8%	4.2%	4.1%	3.6%	3.2%	2.9%	12.9%	9.3%	14.5%	10.8%	4.7%	3.4%
General and Administrative	33.7%	38.9%	37.6%	38.1%	50.3%	25.9%	25.3%	32.3%	19.6%	17.2%	16.6%	13.8%	13.4%	11.8%	11.1%	9.4%	31.4%	26.9%	37.0%	30.2%	16.6%	11.2%
R&D	57.7%	61.2%	61.1%	69.8%	112.5%	48.0%	29.8%	38.5%	23.7%	18.2%	19.1%	17.4%	17.4%	14.7%	13.9%	12.9%	53.9%	53.0%	62.4%	45.1%	19.4%	14.6%
Operating Expenses	110.2%	131.0%	156.9%	142.6%	210.9%	97.4%	63.9%	89.0%	52.5%	43.3%	42.6%	36.3%	35.8%	30.8%	28.9%	25.8%	98.3%	90.9%	135.6%	94.3%	43.0%	29.9%
Operating Margin	-118.6%	-144.0%	-168.6%	-181.6%	-296.5%	-145.6%	-94.3%	-113.7%	-66.3%	-54.2%	-48.9%	-39.1%	-34.7%	-26.7%	-21.8%	-15.8%	-116.2%	-93.8%	-153.5%	-132.7%	-51.0%	-23.9%
Adjusted EBIT	-108.4%	-132.3%	-156.2%	-167.5%	-278.2%	-136.2%	-88.6%	-105.7%	-61.3%	-49.8%	-44.7%	-35.4%	-31.2%	-23.7%	-19.0%	-13.4%	-109.6%	-84.4%	-141.4%	-124.2%	-46.8%	-21.0%
Adjusted EBITDA	-93.1%	-114.6%	-139.2%	-147.5%	-251.0%	-113.2%	-76.9%	-96.7%	-53.3%	-42.8%	-37.7%	-29.4%	-25.2%	-18.7%	-14.0%	-9.4%	-97.7%	-69.9%	-123.9%	-109.2%	-39.8%	-16.1%
Pretax income	-118.4%	-151.1%	-166.3%	-188.8%	-293.2%	-152.2%	-98.1%	-118.5%	-66.0%	-56.9%	-48.8%	-41.4%	-34.7%	-28.5%	-21.7%	-17.4%	-117.0%	-94.8%	-156.3%	-136.8%	-52.3%	-24.8%
Tax Rate	-0.4%	-0.4%	-0.3%	-1.0%	-0.8%	-0.1%	-0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.3%	-0.3%	-0.6%	-0.5%	0.0%	0.0%
Net Margin	-118.9%	-151.7%	-166.8%	-190.7%	-295.5%	-152.4%	-99.1%	-118.5%	-66.0%	-56.9%	-48.8%	-41.4%	-34.7%	-28.5%	-21.7%	-17.4%	-117.4%	-95.1%	-157.2%	-137.4%	-52.3%	-24.8%
QoQ Increase																						
Sales and Marketing	17.8%	20.2%	4.2%	26.6%	-8.0%	24.2%	-10.9%	1%	-5%	-3%	10%	-1%	2%	2%	-2%	0%						
General and Administrative	19.1%	6.8%	12.0%	-7.2%	-0.4%	3.2%	73.3%	0%	-4%	1%	1%	-5%	2%	2%	1%	-4%						
R&D	14.4%	-2.0%	15.8%	4.6%	21.5%	-14.4%	10.0%	1%	-2%	-12%	10%	4%	5%	-2%	2%	5%						

Source: Company reports, Barclays Capital estimates

Figure 160: AONE – Historical and Projected Revenues by Segment

	Mar-10	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-08	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FY	FYE	FYE	FYE
REVENUES BY SEGEMENT																						
Transportation	10.3	10.5	9.5	13.4	12.3	24.4	34.5										9.9	45.3	43.7			
Commercial	4.3	5.1	3.5	3.8	3.1	5.2	4.6										40.8	20.1	16.6			
Electric Grid	5.2	0.0	6.0	2.3	0.0	-	20.5										2.9	11.1	13.6			
Total Product	19.8	15.6	19.0	19.5	15.5	29.6	59.6	47.2	77.1	88.8	93.2	107.0	112.3	130.7	141.0	159.7	53.5	76.5	73.8	151.9	366.2	543.7
Services	4.7	7.1	7.3	4.5	2.6	6.8	4.7	3.1	2.8	2.9	2.9	2.9	2.9	2.9	3.0	3.0	15.0	14.5	23.5	17.3	11.5	11.8
Total Revenues	24.5	22.6	26.2	24.0	18.1	36.4	64.3	50.4	79.9	91.7	96.1	109.9	115.2	133.6	144.0	162.7	68.5	91.0	97.3	169.1	377.6	555.5
Check	-	-	-	-	-	-	-											-	-	-	-	-
COST BY SEGEMENT																						
Product	22.4	19.0	23.8	29.2	31.1	48.8	78.0	60.1	88.6	99.2	99.7	110.6	111.5	125.6	131.2	143.9	70.5	83.8	94.3	218.1	398.0	512.3
Services	4.2	6.6	5.5	4.2	2.5	5.1	5.9	2.6	2.4	2.4	2.5	2.5	2.4	2.5	2.6	2.6	10.3	10.0	20.5	16.1	9.7	10.1
Total cost of revenue	26.5	25.6	29.3	33.4	33.6	53.9	83.9	62.8	91.0	101.6	102.1	113.0	113.9	128.1	133.8	146.5	80.8	93.7	114.8	234.1	407.7	522.3
Check	-	-	-	-	-	-	-	-	-	-	-	-						-	-	-	-	-
GROSS PROFIT BY SEGEMENT																						
Product	(2.6)	(3.4)	(4.8)	(9.7)	(15.6)	(19.3)	(18.4)	(12.9)	(11.4)	(10.4)	(6.5)	(3.5)	0.8	5.1	9.8	15.8	(17.0)	(7.3)	(20.5)	(66.2)	(31.8)	31.4
Services	0.5	0.5	1.7	0.3	0.2	1.7	(1.2)	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	4.7	4.6	3.0	1.2	1.7	1.8
Total Gross Margin	(2.0)	(2.9)	(3.1)	(9.4)	(15.5)	(17.5)	(19.6)	(12.4)	(11.0)	(9.9)	(6.0)	(3.1)	1.2	5.5	10.2	16.2	(12.2)	(2.7)	(17.4)	(65.0)	(30.1)	33.2
% of Sales																						
Product	80.8%	68.8%	72.3%	81.3%	85.4%	81.3%	92.7%	93.8%	96.5%	96.9%	97.0%	97.4%	97.5%	97.8%	97.9%	98.1%	78.1%	84.0%	75.9%	89.8%	97.0%	97.9%
Services	19.2%	31.2%	27.7%	18.7%	14.6%	18.7%	7.3%	6.2%	3.5%	3.1%	3.0%	2.6%	2.5%	2.2%	2.1%	1.9%	21.9%	16.0%	24.1%	10.2%	3.0%	2.1%
Total Revenues	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Gross Margin																						
Product	-13.0%	-22.0%	-25.3%	-49.5%	-101.2%	-65.1%	-30.9%	-27.3%	-14.8%	-11.7%	-6.9%	-3.3%	0.7%	3.9%	6.9%	9.9%	-31.7%	-9.5%	-27.7%	-43.6%	-8.7%	5.8%
Services	11.5%	6.7%	23.6%	6.4%	6.1%	25.4%	-24.6%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	31.4%	31.4%	12.8%	6.9%	15.0%	15.0%
Total Gross Margin	-8.3%	-13.0%	-11.7%	-39.0%	-85.5%	-48.2%	-30.4%	-24.7%	-13.8%	-10.8%	-6.3%	-2.8%	1.1%	4.1%	7.1%	10.0%	-17.9%	-3.0%	-17.9%	-38.4%	-8.0%	6.0%
% Growth QoQ																						
Product	-0.5%	-21.3%	21.9%	3.0%	-20.8%	91.3%	101.6%	-20.7%	63.3%	15.1%	5.0%	14.8%	5.0%	16.3%	7.9%	13.2%						
Transportation	-9.1%	2.0%	-8.8%	40.9%	-8.3%	98.1%	41.5%															
Commercial	12.4%	18.7%	-32.0%	8.9%	-16.8%	65.2%	-11.1%															
Electric Grid	9.6%	-99.7%	37231.3%	-61.0%	-99.6%	-100.0%	NM															
Services	0.8%	50.2%	2.9%	-38.1%	-41.2%	157.3%	-30.5%	-34.0%	-10.0%	2.0%	2.0%	-1.0%	-1.0%	3.0%	2.0%	1.0%						
Total Revenues	-0.3%	-7.6%	16.0%	-8.4%	-24.7%	100.9%	76.9%	-21.7%	58.7%	14.7%	4.9%	14.4%	4.8%	16.0%	7.8%	13.0%						
% Growth YoY																						
Product	-1.7%	-5.8%	-5.2%	-1.7%	-21.8%	90.0%	214.3%	141.9%	399.0%	200.4%	56.4%	126.5%	45.6%	47.2%	51.3%	49.2%		43.0%	-3.5%	105.7%	141.1%	48.5%
Transportation	-21.6%	-17.0%	14.2%	19.1%	20.1%	133.2%	261.9%											359.3%	-3.6%			
Commercial	-39.2%	29.6%	-35.5%	-1.2%	-26.8%	1.8%	32.9%											(0.5)	-17.6%			
Electric Grid			-5.2%	-51.3%	-99.8%	-100.0%	243.2%											2.8	22.4%			
Services	51.5%	121.4%	102.1%	-3.6%	-43.8%	-3.7%	-35.0%	-30.7%	6.2%	-57.9%	-38.2%	-7.3%	2.0%	3.0%	3.0%	5.0%		-3.2%	61.6%	-26.5%	-33.6%	3.2%
Total Revenues	5.4%	14.7%	11.1%	-2.1%	-26.0%	60.8%	145.3%	109.7%	341.7%	152.1%	49.4%	118.2%	44.1%	45.8%	49.8%	48.0%		32.9%	6.9%	73.8%	123.3%	47.1%

Source: Company reports, Barclays Capital estimates

Figure 161: AONE – Historical and Projected Balance Sheet

	Mar-10	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-08	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FY	FYE	FYE	FYE
BALANCE SHEET																						
ASSETS																						
Current Assets																						
Cash and Cash Equivalents	410.5	353.3	300.8	216.8	136.8	294.9	225.8	196.7	148.3	76.4	37.8	3.5	204.2	169.3	133.0	93.6	70.5	457.1	216.8	196.7	3.5	93.6
Restricted Cash	0.8	0.7	2.2	9.4	10.1	9.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	1.7	9.4	0.7	0.7	0.7
Accounts Receivables, net	16.5	18.3	28.0	28.1	26.4	37.5	59.4	55.7	61.3	80.4	84.3	72.3	75.7	73.2	78.9	89.2	17.7	17.7	28.1	55.7	72.3	89.2
Inventory	33.8	41.7	42.6	48.8	63.9	86.0	99.5	75.7	89.7	100.2	89.6	99.1	87.4	98.3	102.6	112.4	35.7	37.4	48.8	75.7	99.1	112.4
Notes receivable																				-		
Prepaid Expenses and other current assets	8.4	7.6	7.9	8.0	10.6	12.1	22.6	13.8	19.9	22.3	22.4	24.8	25.0	28.1	29.3	32.1	5.1	8.9	8.0	13.8	24.8	32.1
Total Current Assets	**470.1**	**421.7**	**381.6**	**311.1**	**247.8**	**440.4**	**408.1**	**342.6**	**320.0**	**279.9**	**234.7**	**200.3**	**393.0**	**369.5**	**344.6**	**328.0**	**129.8**	**522.9**	**311.1**	**342.6**	**200.3**	**328.0**
Property, plant and equipment, net	78.1	116.6	148.4	144.0	171.3	152.1	161.1	166.7	166.7	168.5	171.4	175.8	179.2	184.6	190.3	198.5	52.7	71.7	144.0	166.7	175.8	198.5
Goodwill	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
Intangible assets, net	0.9	0.7	0.6	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.4	1.3	0.4	0.3	0.3	0.3
Deferred offering costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	-	-	-	-	-
Long-term grant receivable	-	-	-	75.8	79.7	94.4	99.5	94.4	91.2	87.1	82.3	76.8	71.6	65.6	59.1	51.8	-	-	75.8	94.4	76.8	51.8
Other Assets	17.0	22.8	20.7	11.8	10.7	8.4	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	9.7	11.7	11.8	8.9	8.9	8.9
Restricted Cash	2.2	2.0	2.2	2.0	2.0	2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	1.0	2.0	0.1	0.1	0.1
Investment (including cash held in escrow)	18.6	20.5	22.4	21.5	22.7	22.3	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	-	-	21.5	23.5	23.5	23.5
Total Assets	**596.4**	**593.9**	**585.5**	**576.2**	**544.1**	**729.5**	**711.0**	**646.0**	**620.2**	**577.9**	**530.8**	**495.2**	**686.2**	**662.1**	**636.4**	**620.6**	**209.0**	**618.1**	**576.2**	**646.0**	**495.2**	**620.6**
LIABILITIES																						
Current Liabilities																						
Revolving credit lines	8.0	8.0	8.0	8.0	8.0	8.0	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1	8.0	8.0	8.0	38.1	38.1	38.1
Current portion of long-term debt	5.2	5.2	5.2	5.4	5.1	4.5	3.4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.6	6.5	5.4	4.5	4.5	4.5
Current portion of capital lease obligations	0.5	0.8	1.2	1.6	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0.4	0.4	1.6	1.8	1.8	1.8
Accounts Payable	17.1	29.6	42.8	43.5	69.6	56.1	65.9	61.9	89.7	100.2	100.7	111.5	112.4	126.3	132.0	144.5	19.5	16.5	43.5	61.9	111.5	144.5
Accrued Expenses	15.0	29.9	37.2	48.2	38.9	35.3	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	14.4	11.7	48.2	39.6	39.6	39.6
Other current liabilities	2.0	1.8	2.3	1.3	2.2	2.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0.4	1.9	1.3	1.3	1.3	1.3
Deferred Revenue	2.9	2.1	11.9	11.1	11.2	11.2	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	13.1	7.5	11.1	8.0	8.0	8.0
Deferred rent	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2
Total Current Liabilities	**50.7**	**77.5**	**108.7**	**119.2**	**137.0**	**119.4**	**158.3**	**155.4**	**183.2**	**193.7**	**194.2**	**204.9**	**205.8**	**219.8**	**225.4**	**237.9**	**60.5**	**52.5**	**119.2**	**155.4**	**204.9**	**237.9**
Long-term debt, net of current portion	6.1	4.8	3.5	4.6	3.6	142.6	142.5	141.1	140.4	139.6	138.9	138.1	368.1	368.1	368.1	368.2	5.9	7.4	4.6	141.1	138.1	368.2
Capital lease obligations, net of current porti	0.5	0.8	3.2	18.7	18.5	18.1	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	0.3	0.2	18.7	17.7	17.7	17.7
Deferred revenue, net of current portion	25.7	25.3	25.9	29.8	29.6	29.3	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	26.0	26.1	29.8	28.8	28.8	28.8
Deferred rent, net of current portion	1.0	1.2	1.3	1.5	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0	0.6	1.5	1.2	1.2	1.2
Other long-term liabilities	5.0	5.0	3.6	3.9	4.7	6.0	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	1.4	2.9	3.9	9.8	9.8	9.8
Preferred stock warrant liability	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	-	-
Total liabilities	**89.0**	**114.7**	**146.4**	**177.6**	**194.7**	**316.8**	**358.4**	**354.1**	**381.1**	**390.8**	**390.6**	**400.6**	**631.5**	**645.5**	**651.1**	**663.6**	**95.1**	**89.8**	**177.6**	**354.1**	**400.6**	**663.6**
SHAREHOLDERS' EQUITY																						
Redeemable Convertible Preferred Stock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	235.0	-	-	-	-	-
Redeemable Common Stock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.5	-	-	-	-	-
Preferred stock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Common stock	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1
Additional paid-in capital	776.1	781.7	785.6	790.3	795.4	914.1	917.8	917.8	917.8	917.8	917.8	917.8	917.8	917.8	917.8	917.8	19.6	767.7	790.3	917.8	917.8	917.8
Accumulated deficit	(267.7)	(301.9)	(345.6)	(391.2)	(444.9)	(500.3)	(564.0)	(623.7)	(676.4)	(728.6)	(775.5)	(821.0)	(860.9)	(899.0)	(930.3)	(958.6)	(152.9)	(238.7)	(391.2)	(623.7)	(821.0)	(958.6)
Accumulated other comprehensive loss	(1.1)	(0.7)	(0.9)	(0.9)	(1.3)	(1.3)	(1.3)	(1.3)	(1.3)	(1.3)	(1.3)	(1.3)	(1.3)	(1.3)	(1.3)	(1.3)	(0.2)	(0.9)	(0.9)	(1.3)	(1.3)	(1.3)
Total Shareholders' Equity (wo noncontrol in	507.4	479.2	439.3	398.2	349.3	412.7	352.7	293.0	240.2	188.1	141.2	95.7	55.8	17.6	(13.7)	(42.0)	(133.4)	528.2	398.2	293.0	95.7	(42.0)
Noncontrolling Interest	0.0	(0.0)	(0.1)	0.3	-	-	-	-	-	-	-	-	-	-	-	-	0.9	0.1	0.3	-	-	-
Total Shareholders' Equity	**507.5**	**479.2**	**439.1**	**398.5**	**349.3**	**412.7**	**352.7**	**293.0**	**240.2**	**188.1**	**141.2**	**95.7**	**55.8**	**17.6**	**(13.7)**	**(42.0)**	**(132.6)**	**528.3**	**398.5**	**293.0**	**95.7**	**(42.0)**
Total Liabilities, redeemable stock and shar	**596.4**	**593.9**	**585.5**	**576.2**	**544.1**	**729.5**	**711.0**	**647.1**	**621.3**	**578.9**	**531.8**	**496.3**	**687.3**	**663.1**	**637.5**	**621.7**	**209.0**	**618.1**	**576.2**	**647.1**	**496.3**	**621.7**
Days In																						
Accounts Receivables	61.7	74.0	97.6	106.8	133.0	94.2	84.3	101.0	70.0	80.0	80.0	60.0	60.0	50.0	50.0	50.0	94.5	71.0	105.4	120.3	69.9	58.6
Inventories	116.4	148.8	132.6	133.3	173.7	145.6	108.2	110.0	90.0	90.0	80.0	80.0	70.0	70.0	70.0	70.0	161.4	145.8	155.2	118.0	88.7	78.5
Inventory Turns	3.0	2.7	2.8	2.9	2.4	2.9	3.6	2.9	4.4	4.3	4.3	4.8	4.9	5.5	5.3	5.5	1.2	1.7	2.7	3.8	4.7	4.9
Prepaid Expenses	28.8	27.3	24.7	21.9	28.8	20.5	24.6	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	23.1	34.6	25.5	21.5	22.2	22.4
Accounts Payable	59.0	105.7	133.5	118.9	189.3	95.0	71.7	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	88.0	64.1	138.4	96.5	99.8	101.0
Valuation Ratios																						
Return on Equity	-22.9%	-28.6%	-39.8%	-46.0%	-61.2%	-53.7%	-72.3%	-81.5%	-87.9%	-110.9%	-132.8%	-190.2%	-286.2%	-865.3%	916.1%	269.7%	60.7%	-16.4%	-38.4%	(0.8)	(2.1)	3.3
Return on Average Equity (LTM)	-19.1%	-22.7%	-29.5%	-38.4%	-50.8%	-48.1%	-61.9%	-79.3%	-96.4%	-121.4%	-149.8%	-206.2%	-330.6%	-966.7%	1133.1%	328.0%	-15.3%	-13.4%	-38.4%	(0.8)	(2.1)	3.3
Return on Assets	-19.5%	-23.1%	-29.9%	-31.8%	-39.3%	-30.4%	-35.8%	-36.9%	-34.0%	-36.1%	-35.3%	-36.7%	-23.3%	-23.0%	-19.7%	-18.2%	-154.0%	-56.0%	-106.2%	(1.4)	(1.6)	(0.9)
Return on Net Assets	-22.9%	-28.6%	-39.8%	-46.0%	-61.2%	-53.7%	-72.3%	-81.8%	-88.3%	-111.5%	-133.8%	-192.3%	-291.7%	-920.2%	850.7%	263.1%	-282.5%	-65.6%	-153.5%	(3.2)	(8.3)	12.8
Return on Sales	-118.9%	-151.7%	-166.8%	-190.7%	-295.5%	-152.4%	-99.1%	-118.5%	-66.0%	-56.9%	-48.8%	-41.4%	-34.7%	-28.5%	-21.7%	-17.4%	-117.4%	-95.1%	-157.2%	(1.4)	(0.5)	(0.2)
Liquidity Ratios																						
Current Ratio	9.3	5.4	3.5	2.6	1.8	3.7	2.6	2.2	1.7	1.4	1.2	1.0	1.9	1.7	1.5	1.4	2.1	10.0	2.6	2.2	1.0	1.4
Net Working Capital	8.9	(9.2)	(28.0)	(24.9)	(26.0)	26.1	24.0	(9.5)	(11.5)	9.9	2.7	(8.1)	(17.0)	(19.5)	(13.8)	(3.6)	(79.1)	(95.2)	(265.1)	(303.4)	(294.9)	(292.6)
Book Value Per Share	4.9	4.6	4.2	3.8	3.3	3.3	2.8	2.3	1.9	1.5	1.1	0.7	0.4	0.1	(0.1)	(0.3)	(14.9)	15.7	3.8	2.4	0.7	(0.3)
Tangible Book Value Per Share	4.8	4.5	4.1	3.7	3.2	3.2	2.7	2.2	1.8	1.4	1.0	0.7	0.4	0.1	(0.2)	(0.4)						
Cash Per Share	4.0	3.4	2.9	2.1	1.3	2.4	1.8	1.6	1.2	0.6	0.3	0.0	1.6	1.3	1.0	0.7	7.9	13.6	2.1	1.6	0.0	0.7
Net Cash Per Share	3.9	3.3	2.8	2.0	1.2	1.2	0.6	0.4	0.0	(0.5)	(0.8)	(1.1)	(1.3)	(1.5)	(1.8)	(2.1)	6.7	13.2	2.0	0.4	(1.1)	(2.1)
Cash Per Share (incl LT Investments)	4.2	3.6	3.1	2.3	1.5	2.5	2.0	1.7	1.3	0.8	0.5	0.2	1.7	1.5	1.2	0.9	7.9	13.6	2.3	1.8	0.2	0.9
Net Cash Per Share (incl LT Investments)	4.04	3.49	3.00	2.19	1.43	1.37	0.82	0.59	0.21	(0.34)	(0.64)	(0.89)	(1.11)	(1.37)	(1.64)	(1.92)	6.74	13.16	2.19	0.6	(0.9)	(1.9)

Source: Company reports, Barclays Capital estimates

Source: Company reports, Barclays Capital estimates

Figure 162: AONE – Historical and Projected Statement of Cash Flows

($ millions except per share data)	Mar-10 1Q	Jun-10 2Q	Sep-10 3Q	Dec-10 4Q	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-08 FY	Dec-09 FY	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE
CASH FLOW STATEMENT																						
Operating Activities																						
Net Income	(29.1)	(34.3)	(43.7)	(45.8)	(53.7)	(55.4)	(63.7)	(59.7)	(52.8)	(52.1)	(46.9)	(45.5)	(39.9)	(38.1)	(31.3)	(28.3)	(80.4)	(86.6)	(152.9)	(232.5)	(197.3)	(137.7)
Adjustments:																						
Depreciation and amortization	3.7	4.0	4.5	4.8	4.9	5.8	7.5	4.5	6.4	6.4	6.7	6.6	6.9	6.7	7.2	6.5	8.2	13.2	17.0	22.8	26.1	27.3
Noncash rent	0.4	0.3	0.1	0.1	(0.1)	(0.1)	(0.0)										(0.1)	0.5	0.9	(0.2)	-	-
Noncash foreign exchange loss (gain) on i	(0.3)	0.9	(0.9)	(0.1)	(0.4)	0.4	-										1.2	(0.9)	(0.4)	-	-	-
Noncash loss on equity investments	-	-	(0.1)	0.9	0.2	0.4	0.1										-	-	0.8	0.8	-	-
Impairment of long-lived and intangible as	0.5	-	-	0.2	-	2.6	-										3.1	0.9	0.8	2.6	-	-
Gain on asset transfer and subsequent deconsolidation of Variable Interest Entity				-	(1.3)	-	-													(1.3)	-	-
Unrealized loss on preferred stock warrant	-	-	-	-	-	-	-										0.3	0.5	-	-	-	-
Loss on disposal of property and equipme	-	0.1	0.1	-	0.0	-	-										0.0	0.0	0.3	0.0	-	-
Amortization of debt issuance costs and n	-	-	-	0.3	0.4	0.7	0.7										0.1	0.1	0.3	1.9	-	-
Stock-based compensation	2.5	2.6	3.2	3.4	3.3	3.4	3.7										4.5	8.6	11.8	10.4	-	-
Minority Interest in net loss																						
Changes in operating assets and liabilities																						
Accounts receivable	0.2	(2.6)	(7.5)	0.6	1.3	(11.5)	(23.2)	3.7	(5.6)	(19.0)	(3.9)	12.0	(3.5)	2.5	(5.7)	(10.2)	(6.6)	0.0	(9.4)	(29.7)	(16.5)	(16.9)
Inventory	3.7	(8.2)	(0.5)	(6.2)	(15.3)	(22.2)	(14.5)	23.8	(14.0)	(10.5)	10.7	(9.5)	11.7	(10.9)	(4.4)	(9.7)	(15.8)	(1.6)	(11.2)	(28.2)	(23.4)	(13.3)
Prepaid expenses and other assets	0.0	(1.8)	(1.5)	0.7	(4.7)	(0.9)	(9.6)	8.8	(6.2)	(2.3)	(0.1)	(2.4)	(0.2)	(3.1)	(1.2)	(2.8)	(1.7)	2.0	(2.6)	(6.4)	(11.0)	(7.3)
Accounts payable	(2.0)	9.4	10.5	(8.8)	18.7	4.4	3.5	(4.0)	27.8	10.5	0.5	10.7	0.9	14.0	5.6	12.5	11.2	(4.3)	9.2	22.8	49.5	33.0
Accrued expenses	(0.4)	(2.0)	(0.7)	5.7	(3.1)	6.6	10.9	-	-	-	-	-	-	-	-	-	8.0	(0.5)	2.6	14.3	-	-
Deferred Revenue	(4.1)	(0.4)	8.3	2.5	0.3	0.1	(2.5)	-	-	-	-	-	-	-	-	-	32.9	(5.5)	6.3	(2.0)	-	-
Other liabilities	0.9	0.0	(2.3)	0.2	0.7	0.8	2.4	-	-	-	-	-	-	-	-	-	0.2	0.0	(1.2)	4.0	-	-
Net Cash Provided by Operating Activities	**(24.0)**	**(31.8)**	**(30.7)**	**(41.4)**	**(48.5)**	**(64.9)**	**(84.6)**	**(22.7)**	**(44.4)**	**(67.1)**	**(33.0)**	**(28.1)**	**(24.1)**	**(28.9)**	**(29.8)**	**(32.0)**	**(34.9)**	**(73.6)**	**(127.8)**	**(220.7)**	**(172.6)**	**(114.9)**
Investing Activities																						
Increase in restricted cash	(0.3)	0.4	(1.7)	(7.0)	(0.7)	0.2	11.1	-	-	-	-	-	-	-	-	-	(0.2)	(1.8)	(8.6)	10.5	-	-
Purchases of property, plant and equipme	(13.9)	(47.1)	(46.8)	(69.5)	(42.7)	(43.5)	(27.5)	(10.1)	(6.4)	(8.2)	(9.6)	(11.0)	(10.4)	(12.0)	(13.0)	(14.6)	(41.4)	(39.4)	(177.2)	(123.8)	(35.2)	(50.0)
Proceeds from sale of property and equipr	-	-		-	-	-	-										0.5	0.0	-	-	-	-
Proceeds from government grant	5.7	20.6	23.3	28.5	12.2	14.0	5.9	5.0	3.2	4.1	4.8	5.5	5.2	6.0	6.5	7.3	-	-	78.2	37.1	17.6	25.0
Repayments on notes receivable	-	-	-	-	-	-	-										0.0	-	-	-	-	-
Purchase of investment (including cash he	(13.0)	-	(1.9)	-	(1.9)	-	(1.4)										-	-	(14.9)	(3.3)	-	-
Net Cash Provided by Investing Activities	(21.5)	(26.1)	(27.0)	(47.9)	(33.2)	(29.4)	(11.9)	(5.0)	(3.2)	(4.1)	(4.8)	(5.5)	(5.2)	(6.0)	(6.5)	(7.3)	(41.1)	(41.2)	(122.5)	(79.5)	(17.6)	(25.0)
Financing Activities																						
Deferred offering costs	-	-	-	-	(0.1)	0.1	-										-	-	-	-	-	-
Net proceeds from initial public offering of	-	-	-	-	-	-	-										(3.8)	395.8	-	-	-	-
Proceeds from government grant	1.3	-	6.0	2.5	0.9	-	-										-	3.9	9.8	0.9	-	-
Proceeds from issuance of common stock	-	-	-	-	-	115.3	(0.1)										5.0	-	-	115.2	-	-
Proceeds from exercise of stock options	0.5	1.8	0.8	1.2	1.9	0.1	0.0										0.1	0.4	4.3	2.0	-	-
Advances under revolving credit lines	-	-	-	-	-	-	38.1										4.3	-	-	38.1	-	-
Proceeds from issuance of long-term debt	-	-	-	2.5	-	139.1	(0.2)										9.1	8.6	2.5	138.8	-	-
Payments on long-term debt	(2.7)	(1.3)	(1.3)	(1.3)	(1.3)	(1.3)	(9.4)	(1.4)	(0.8)	(0.8)	(0.8)	(0.8)	230.0	0.0	0.0	0.0	(4.0)	(6.2)	(6.5)	(13.4)	(3.0)	230.0
Payments on capital lease obligations	(0.2)	(0.1)	(0.2)	(0.2)	(0.3)	(0.9)	(0.9)										(1.3)	(0.7)	(0.7)	(2.1)	-	-
Contributions from noncontrolling interest	-	-	-	0.5	0.6	-	-										-	-	0.5	0.6	-	-
Net proceeds from issuance of redeemable	-	-	-	-	-	-											11.5	-	-	-	-	-
Net proceeds from issuance of redeemable	-	-	-	-	-	-											102.0	99.6	-	-	-	-
Net Cash Provided by Financing Activities	(1.1)	0.4	5.3	5.3	1.7	252.4	27.4	(1.4)	(0.8)	(0.8)	(0.8)	(0.8)	230.0	0.0	0.0	0.0	123.0	501.4	9.9	280.1	(3.0)	230.0
Effect of foreign exchange rates on cash a	(0.0)	0.3	(0.1)	0.0	(0.0)	(0.0)	(0.0)	-	-	-	-	-	-	-	-	-	0.2	(0.1)	0.2	(0.0)	-	-
Net decrease in cash and cash equivalents	(46.6)	(57.2)	(52.5)	(84.0)	(80.0)	158.1	(69.1)	(29.1)	(48.3)	(71.9)	(38.6)	(34.3)	200.7	(35.0)	(36.3)	(39.3)	47.2	386.6	(240.3)	(20.2)	(193.2)	90.2
Cash and cash equivalents at beginning of	457.1	410.5	353.3	300.8	216.8	136.8	294.9	225.8	196.7	148.3	76.4	37.8	3.5	204.2	169.3	133.0	23.4	70.5	457.1	216.8	196.7	3.5
Cash and cash equivalents at end of perio	410.5	353.3	300.8	216.8	136.8	294.9	225.8	196.7	148.3	76.4	37.8	3.5	204.2	169.3	133.0	93.6	70.5	457.1	216.8	196.7	3.5	93.6
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Source: Company reports, Barclays Capital estimates

Figure 163: AMRC – Historical and Projected Income Statement

	Mar-10	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FYE	FYE	FYE
INCOME STATEMENT																					
Total Revenues	**105.6**	**141.4**	**191.9**	**179.3**	**146.4**	**165.5**	**227.8**	**185.7**	**155.5**	**183.3**	**228.6**	**224.4**	**195.0**	**203.5**	**224.9**	**210.0**	**428.5**	**618.2**	**725.4**	**791.8**	**833.5**
% Growth - QoQ	-20.8%	33.8%	35.8%	-6.5%	-18.4%	13.0%	37.7%	-18.5%	-16.2%	17.8%	24.7%	-1.9%	-13.1%	4.3%	10.5%	-6.6%					
% Growth - YoY		58.0%	45.1%	34.5%	38.6%	17.1%	18.7%	3.5%	6.2%	10.7%	0.4%	20.8%	25.4%	11.0%	-1.6%	-6.4%		44%	17%	9%	5%
Cost of Revenue:	87.2	115.2	157.0	148.1	118.4	133.3	187.9	151.0	126.5	149.3	185.3	181.8	159.0	165.0	182.3	169.9	348.8	507.5	590.7	642.9	676.2
Gross Profit (loss)	18.4	26.2	34.9	31.3	28.0	32.2	39.9	34.8	29.0	34.0	43.3	42.6	36.1	38.5	42.6	40.0	79.7	110.7	134.7	148.9	157.2
Operating expenses																					
Salaries and Benefits	8.2	5.3	8.4	8.8	10.1	8.2	11.0	9.7	9.9	9.6	10.0	10.1	10.0	9.8	10.3	10.4	28.3	30.7	38.9	39.6	40.7
Project Development Costs	3.1	2.0	2.7	5.8	4.4	5.3	5.2	4.8	4.8	5.0	5.1	5.2	5.4	5.9	6.0	6.1	9.6	13.7	19.6	20.2	23.3
General. Administrative and Other	4.5	6.8	4.8	4.2	5.2	5.4	7.3	6.2	6.4	6.6	6.2	5.9	6.0	6.1	6.2	6.2	16.5	20.3	24.0	25.2	24.6
Total Operating Expenses	15.8	14.1	16.0	18.8	19.7	18.8	23.4	20.6	21.1	21.2	21.4	21.3	21.4	21.8	22.5	22.7	54.4	64.7	82.5	85.0	88.5
Operating Income / (Loss)	**2.6**	**12.0**	**18.9**	**12.5**	**8.3**	**13.4**	**16.4**	**14.1**	**7.9**	**12.8**	**21.9**	**21.3**	**14.6**	**16.6**	**20.1**	**17.3**	**25.3**	**46.0**	**52.2**	**63.9**	**68.7**
Depreciation and Implairment	2.1	1.9	4.8	2.6	2.7	2.8	4.0	2.9	2.4	2.8	3.5	3.5	3.0	3.1	3.5	3.2	6.6	11.4	12.4	12.2	12.9
Stock-based compensation	0.4	0.7	0.7	0.7	0.9	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.2	2.5	2.5	1.7	1.7
Adjusted EBITDA	**5.1**	**14.6**	**24.4**	**15.8**	**11.8**	**16.9**	**20.9**	**17.4**	**10.7**	**16.1**	**25.8**	**25.2**	**18.1**	**20.2**	**24.0**	**21.0**	**35.1**	**59.9**	**67.1**	**77.9**	**83.3**
Other Expenses Net	(0.9)	(1.2)	(2.0)	(1.0)	(0.9)	(1.0)	(1.4)	(2.4)	(0.9)	(0.9)	(0.9)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	1.6	(5.1)	(5.6)	(3.7)	(4.0)
Total Non-Operating Income/ (Loss)	(0.9)	(1.2)	(2.0)	(1.0)	(0.9)	(1.0)	(1.4)	(2.4)	(0.9)	(0.9)	(0.9)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	1.6	(5.1)	(5.6)	(3.7)	(4.0)
Pretax Income / (Loss)	1.7	10.8	16.9	11.5	7.4	12.4	15.0	11.8	7.0	11.9	20.9	20.4	13.7	15.6	19.1	16.3	26.9	40.9	46.6	60.2	64.7
Provision for income taxes	(0.4)	(3.1)	(4.9)	(3.8)	(2.1)	(3.5)	(2.7)	(3.3)	(2.0)	(3.3)	(5.9)	(5.7)	(3.8)	(4.4)	(5.4)	(4.6)	(6.9)	(12.2)	(11.6)	(16.9)	(18.1)
Net income / (loss)	**1.3**	**7.7**	**12.0**	**7.7**	**5.3**	**8.8**	**12.4**	**8.5**	**5.1**	**8.6**	**15.1**	**14.7**	**9.8**	**11.3**	**13.8**	**11.7**	**19.9**	**28.7**	**35.0**	**43.3**	**46.6**
Other Comprehensive Income (loss):																					
Unrealized loss from Interest Rate Hedge, Net of tax	(0.3)	(1.2)	(0.7)	1.4	0.2	(0.5)	(1.8)										-	(0.9)	(2.0)	-	-
Foreign Currency Translation Adjustment	1.0	(1.2)	0.9	1.0	0.8	0.1	(2.3)										3.5	1.7	(1.4)	-	-
Comprehensive Income	**2.0**	**5.3**	**12.2**	**10.0**	**6.3**	**8.5**	**8.3**	**8.5**	**5.1**	**8.6**	**15.1**	**14.7**	**9.8**	**11.3**	**13.8**	**11.7**	**23.4**	**29.4**	**31.6**	**43.3**	**46.6**
EPS - Basic	0.10	0.56	0.35	0.19	0.13	0.21	0.29	0.19	0.12	0.19	0.34	0.33	0.22	0.25	0.31	0.26	1.99	1.12	0.82	0.98	1.04
EPS - Diluted	**0.03**	**0.20**	**0.28**	**0.17**	**0.12**	**0.19**	**0.27**	**0.18**	**0.11**	**0.18**	**0.32**	**0.31**	**0.21**	**0.24**	**0.29**	**0.24**	**0.61**	**0.69**	**0.76**	**0.92**	**0.97**
Shares Outstanding (Basic)	13.3	13.7	34.4	41.1	41.3	42.4	43.1	43.5	43.7	43.9	44.1	44.3	44.5	44.7	44.9	45.1	10.0	25.7	42.6	44.0	44.8
Shares Outstanding (Diluted)	36.6	38.4	43.4	46.1	45.8	45.9	46.3	46.5	46.7	46.9	47.1	47.3	47.5	47.7	47.9	48.1	32.7	41.5	46.1	47.0	47.8
Margin Analysis																					
Gross Margin	17.4%	18.5%	18.2%	17.4%	19.1%	19.4%	17.5%	18.7%	18.6%	18.5%	18.9%	19.0%	18.5%	18.9%	19.0%	19.1%	18.6%	17.9%	18.6%	18.8%	18.9%
Salaries and Benefits	7.7%	3.8%	4.4%	4.9%	6.9%	4.9%	4.8%	5.2%	6.3%	5.2%	4.4%	4.5%	5.1%	4.8%	4.6%	5.0%	6.6%	5.0%	5.4%	5.0%	4.9%
Project Development Costs	3.0%	1.4%	1.4%	3.2%	3.0%	3.2%	2.3%	2.6%	3.1%	2.8%	2.3%	2.3%	2.7%	2.9%	2.7%	2.9%	2.2%	2.2%	2.7%	2.6%	2.8%
General and Administrative	4.3%	4.8%	2.5%	2.3%	3.5%	3.2%	3.2%	3.3%	4.1%	3.6%	2.7%	2.6%	3.1%	3.0%	2.7%	3.0%	3.9%	3.3%	3.3%	3.2%	2.9%
Operating Expenses	15.0%	10.0%	8.3%	10.5%	13.4%	11.4%	10.3%	11.1%	13.6%	11.6%	9.4%	9.5%	11.0%	10.7%	10.0%	10.8%	12.7%	10.5%	11.4%	10.7%	10.6%
Operating Margin	2.4%	8.5%	9.9%	7.0%	5.7%	8.1%	7.2%	7.6%	5.1%	7.0%	9.6%	9.5%	7.5%	8.2%	8.9%	8.2%	5.9%	7.4%	7.2%	8.1%	8.2%
Adjusted EBITDA Margin	4.9%	10.3%	12.7%	8.8%	8.1%	10.2%	9.2%	9.4%	6.9%	8.8%	11.3%	11.2%	9.3%	9.9%	10.7%	10.0%	8.2%	9.7%	9.2%	9.8%	10.0%
EBIT Margin	2.4%	8.5%	9.9%	7.0%	5.7%	8.1%	7.2%	7.6%	5.1%	7.0%	9.6%	9.5%	7.5%	8.2%	8.9%	8.2%	5.9%	7.4%	7.2%	8.1%	8.2%
Pretax income	1.6%	7.6%	8.8%	6.4%	5.1%	7.5%	6.6%	6.3%	4.5%	6.5%	9.1%	9.1%	7.0%	7.7%	8.5%	7.8%	6.3%	6.6%	6.4%	7.6%	7.8%
Tax Rate	25.1%	28.6%	28.8%	33.1%	28.6%	28.6%	17.9%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%	25.9%	29.8%	25.0%	28.0%	28.0%
Net Margin	1.2%	5.5%	6.3%	4.3%	3.6%	5.3%	5.4%	4.6%	3.3%	4.7%	6.6%	6.5%	5.0%	5.5%	6.1%	5.6%	4.6%	4.6%	4.8%	5.5%	5.6%
QoQ Increase																					
Salaries and Benefits	-13.7%	-34.7%	57.8%	5.0%	14.2%	-19.1%	34.6%	-12.0%	2.0%	-3.0%	5.0%	1.0%	-1.0%	-2.0%	5.0%	1.0%					
Project Development Costs	14.3%	-34.6%	32.7%	112.9%	-23.9%	19.6%	-1.7%	-8.0%	1.0%	5.0%	2.0%	1.0%	3.0%	10.0%	2.0%	1.0%					
General. Administrative and Other	39.1%	48.7%	-28.4%	-14.2%	25.0%	3.4%	35.7%	-15.0%	4.0%	2.0%	-5.0%	-5.0%	2.0%	1.0%	1.0%	1.0%					

Source: Company reports, Barclays Capital estimates

Figure 164: AMRC – Historical and Projected Revenues by Segment

($ millions except per share data)	Mar-10 1Q	Jun-10 2Q	Sep-10 3Q	Dec-10 4Q	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-09 FY	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE
PERFORMANCE BY SEGMENT																					
Revenues																					
Energy Efficiency	74.9	100.8	147.9	131.8	106.2	123.8	188.7	152.5	122.0	150.0	195.1	191.2	162.5	170.6	191.1	175.8	340.6	455.3	571.2	658.2	700.0
Renewable Energy	30.7	40.5	44.0	47.6	40.2	41.7	39.1	33.2	33.6	33.2	33.6	33.2	32.6	32.9	33.9	34.2	87.9	162.9	154.2	133.5	133.5
Total Revenues	105.6	141.4	191.9	179.3	146.4	165.5	227.8	185.7	155.5	183.3	228.6	224.4	195.0	203.5	224.9	210.0	428.5	618.2	725.4	791.8	833.5
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
% of Sales																					
Energy Efficiency	70.9%	71.3%	77.1%	73.5%	72.5%	74.8%	82.8%	82.1%	78.4%	81.9%	85.3%	85.2%	83.3%	83.8%	84.9%	83.7%	79.5%	73.7%	78.7%	83.1%	84.0%
Renewable Energy	29.1%	28.7%	22.9%	26.5%	27.5%	25.2%	17.2%	17.9%	21.6%	18.1%	14.7%	14.8%	16.7%	16.2%	15.1%	16.3%	20.5%	26.3%	21.3%	16.9%	16.0%
Total Revenues	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% QoQ																					
Energy Efficiency	-24.6%	34.6%	46.6%	-10.9%	-19.4%	16.6%	52.5%	-19.2%	-20.0%	23.0%	30.0%	-2.0%	-15.0%	5.0%	12.0%	-8.0%					
Renewable Energy	-9.7%	31.8%	8.7%	8.1%	-15.5%	3.7%	-6.3%	-15.0%	1.0%	-1.0%	1.0%	-1.0%	-2.0%	1.0%	3.0%	1.0%					
Total Revenues	-20.8%	33.8%	35.8%	-6.5%	-18.4%	13.0%	37.7%	-18.5%	-16.2%	17.8%	24.7%	-1.9%	-13.1%	4.3%	10.5%	-6.6%					
% YoY																					
Energy Efficiency	30.9%	30.5%	38.4%	32.6%	41.8%	22.8%	27.6%	15.7%	14.9%	21.2%	3.4%	25.4%	33.2%	13.7%	-2.0%	-8.0%		33.7%	25.4%	15.2%	6.3%
Renewable Energy	90.2%	232.2%	72.8%	39.8%	30.9%	2.9%	-11.2%	-30.2%	-16.6%	-20.3%	-14.2%	0.0%	-3.0%	-1.0%	0.9%	3.0%		85.4%	-5.3%	-13.4%	0.0%
Total Revenues	43.9%	58.0%	45.1%	34.5%	38.6%	17.1%	18.7%	3.5%	6.2%	10.7%	0.4%	20.8%	25.4%	11.0%	-1.6%	-6.4%		44.3%	17.3%	9.2%	5.3%
Costs of Good Sold																					
Energy Efficiency	62.5	83.1	121.9	110.6	86.4	102.2	155.9	125.0	100.0	123.0	159.0	155.8	133.2	139.0	155.7	143.3	282.3	378.1	469.5	537.8	571.3
Renewable Energy	24.7	32.1	35.1	37.5	32.1	31.1	32.1	25.9	26.5	26.2	26.3	26.0	25.7	26.0	26.6	26.7	66.5	129.4	121.1	105.1	104.9
Total Cost of Goods Sold	87.2	115.2	157.0	148.1	118.4	133.3	187.9	151.0	126.5	149.3	185.3	181.8	159.0	165.0	182.3	169.9	348.8	507.5	590.7	642.9	676.2
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Profit																					
Energy Efficiency	12.4	17.8	26.0	21.2	19.8	21.5	32.8	27.4	22.0	27.0	36.1	35.4	29.2	31.6	35.3	32.5	58.3	77.2	101.6	120.4	128.7
Renewable Energy	6.0	8.4	8.9	10.1	8.2	10.6	7.0	7.3	7.0	7.0	7.2	7.2	6.8	6.9	7.3	7.5	21.4	33.5	33.1	28.5	28.5
Total Gross Profit	18.4	26.2	34.9	31.3	28.0	32.2	39.9	34.8	29.0	34.0	43.3	42.6	36.1	38.5	42.6	40.0	79.7	110.7	134.7	148.9	157.2
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Margins																					
Energy Efficiency	16.5%	17.6%	17.6%	16.1%	18.7%	17.4%	17.4%	18.0%	18.0%	18.0%	18.5%	18.5%	18.0%	18.5%	18.5%	18.5%	17.1%	17.0%	17.8%	18.3%	18.4%
Renewable Energy	19.6%	20.7%	20.3%	21.2%	20.3%	25.5%	18.0%	22.0%	21.0%	21.0%	21.5%	21.8%	21.0%	21.0%	21.5%	22.0%	24.4%	20.5%	21.5%	21.3%	21.4%
Total	17%	19%	18%	17%	19%	19%	17%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	18%	19%	19%	19%
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Source: Company reports, Barclays Capital estimates

Figure 165: AMRC – Historical and Projected Balance Sheet

	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FYE	FYE	FYE
BALANCE SHEET																	
ASSETS																	
Current Assets																	
Cash and Cash Equivalents	29.3	59.8	31.7	55.1	32.2	20.2	7.3	6.3	8.8	2.4	(5.6)	(6.1)	47.9	44.7	55.1	6.3	(6.1)
Restricted Cash	9.1	9.5	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	9.2	9.2	12.7	12.7	12.7
Total Accounts Receivable	94.0	100.3	162.4	111.9	93.8	110.5	137.8	135.2	117.6	122.6	135.6	126.6	70.5	87.0	111.9	135.2	126.6
Costs and Estimated Earnings in Excess of Billings	41.8	46.6	55.1	55.1	55.1	55.1	55.1	55.1	55.1	55.1	55.1	55.1	14.0	35.6	55.1	55.1	55.1
Inventories	8.4	8.8	8.3	9.9	8.3	9.8	12.2	12.0	10.5	10.9	12.0	11.2	4.2	6.8	9.9	12.0	11.2
Prepaid Expenses and other current assets	8.5	9.2	10.2	9.9	8.3	9.8	12.2	12.0	10.5	10.9	12.0	11.2	8.1	8.5	9.9	12.0	11.2
Income Tax Receivable	7.2	9.2	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	-	2.5	9.5	9.5	9.5
Deferred Income Taxes	12.2	11.5	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	9.3	9.9	12.7	12.7	12.7
Project Development Costs	6.6	6.8	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.5	7.6	8.2	8.2	8.2
Total Current Assets	**217.2**	**261.6**	**310.8**	**285.1**	**240.7**	**248.4**	**267.6**	**263.6**	**245.4**	**244.9**	**252.1**	**240.9**	**171.8**	**211.7**	**285.1**	**263.6**	**240.9**
Federal ESPC Receivable	216.1	214.7	236.6	225.2	225.2	202.2	179.3	156.4	133.5	110.6	87.6	64.7	51.4	193.6	225.2	156.4	64.7
Property, Plant and Equipment, net	5.9	6.2	6.7	6.7	6.7	6.7	6.7	6.8	6.8	6.8	6.8	6.8	4.4	5.4	6.7	6.8	6.8
Project Assets, Net	143.0	148.9	169.1	180.6	190.3	201.7	215.9	229.9	242.0	254.6	268.6	281.7	117.6	145.1	180.6	229.9	281.7
Deferred Financing Fees	3.4	3.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.6	3.4	3.7	3.7	3.7
Goodwill	20.6	20.6	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	16.1	20.6	41.9	41.9	41.9
Intangible Assets, net			13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	-		13.2	13.2	13.2
Other Assets	4.0	4.9	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	10.6	4.6	6.4	6.4	6.4
Total Assets	**610.2**	**660.6**	**788.4**	**762.8**	**728.1**	**724.3**	**734.8**	**721.8**	**692.9**	**682.1**	**680.4**	**659.4**	**375.5**	**584.4**	**762.8**	**721.8**	**659.4**
LIABILITIES																	
Current Liabilities																	
Current Portion of Long Term Debt	11.0	11.0	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	8.1	4.7	11.1	11.1	11.1
Accounts Payable	72.4	77.8	116.3	87.7	73.5	86.7	107.6	105.6	92.3	95.8	105.9	98.7	75.6	95.3	87.7	105.6	98.7
Accrued Expenses	12.9	7.0	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	18.4	12.5	12.3	12.3	12.3
Billings in Excess of Costs and Estimated Earnings	23.2	27.5	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	28.2	27.6	31.3	31.3	31.3
Income Tax Payable	1.7	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	2.1	2.5	0.8	0.8	0.8
Total Current Liabilities	**121.3**	**124.3**	**171.8**	**143.2**	**129.0**	**142.2**	**163.2**	**161.1**	**147.8**	**151.4**	**161.4**	**154.2**	**132.3**	**142.6**	**143.2**	**161.1**	**154.2**
Long-Term Debt, Net of Current Portion	231.9	263.4	325.9	320.4	294.8	269.3	243.7	218.2	192.6	167.1	141.5	116.0	102.8	202.4	320.4	218.2	116.0
Subordinated Debt	-	-	-	-	-	-	-	-	-	-	-	-	3.0	-	-	-	-
Deferred Income Taxes	16.6	16.3	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	11.9	12.0	24.1	24.1	24.1
Deferred Grant Income	6.3	6.2	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	4.2	4.2	6.1	6.1	6.1
Other Non-Current Liabilities	30.1	31.0	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	18.6	28.1	29.7	29.7	29.7
Total Liabilities	**406.2**	**441.2**	**557.6**	**523.5**	**483.8**	**471.4**	**466.8**	**439.2**	**400.4**	**378.4**	**362.9**	**330.1**	**272.8**	**389.4**	**523.5**	**439.2**	**330.1**
													-	-	-	-	-
Total Shareholders' Equity	**204.0**	**219.3**	**230.8**	**239.3**	**244.4**	**252.9**	**268.0**	**282.6**	**292.5**	**303.7**	**317.5**	**329.2**	**102.8**	**195.1**	**239.3**	**282.6**	**329.2**
Total Liabilities, redeemable stock and shareholders' equity	**610.2**	**660.6**	**788.4**	**762.8**	**728.1**	**724.3**	**734.8**	**721.8**	**692.9**	**682.1**	**680.4**	**659.4**	**375.5**	**584.4**	**762.8**	**721.8**	**659.4**
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Days In																	
Accounts Receivables, net	58.6	55.3	65.1	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	60.1	51.4	56.3	62.3	55.4
Inventories	6.5	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.4	4.9	6.1	6.8	6.0
Inventory Turns	62.4	62.1	88.0	66.2	55.5	65.8	67.4	60.2	56.8	62.0	63.9	58.7	45.3	92.1	70.7	58.8	58.5
Prepaid Expenses	6.6	6.3	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	8.5	6.1	6.1	6.8	6.0
Accounts Payable	55.8	53.2	56.5	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	79.1	68.5	54.2	59.9	53.3
Liquidity Ratios																	
Current Ratio	1.8	2.1	1.8	2.0	1.9	1.7	1.6	1.6	1.7	1.6	1.6	1.6	1.3	1.5	2.0	1.6	1.6
Net Working Capital	57.5	68.0	94.6	74.0	66.8	73.3	84.4	83.5	76.0	78.4	83.6	80.1	(17.7)	15.2	74.0	83.5	80.1
Long Term Debt / Equity	113.7%	120.1%	141.2%	133.9%	120.7%	106.5%	91.0%	77.2%	65.9%	55.0%	44.6%	35.2%	103.0%	103.8%	1.3	0.8	0.4
Total Debt / Equity	119.1%	125.1%	146.0%	1.4	1.3	1.1	1.0	0.8	0.7	0.6	0.5	0.4	110.8%	106.2%	1.4	0.8	0.4
Total Debt / Total Capital	54.4%	55.6%	59.4%	58.1%	55.6%	52.6%	48.7%	44.8%	41.1%	37.0%	32.5%	27.9%	52.6%	51.5%	58.1%	44.8%	0.3
Book Value Per Share	4.5	4.8	5.0	5.1	5.2	5.4	5.7	6.0	6.2	6.4	6.6	6.8	3.1	4.7	5.2	6.0	6.9
Cash Per Share	0.8	1.5	1.0	1.5	1.0	0.7	0.4	0.4	0.5	0.3	0.1	0.1	1.7	1.3	1.5	0.4	0.1

Source: Company reports, Barclays Capital estimates

Figure 166: AMRC – Historical and Projected Statement of Cash Flows

	Mar-10	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FYE	FYE	FYE
CASH FLOW STATEMENT																					
Operating Activities																					
Net Income	1.3	7.7	12.0	7.7	5.3	8.8	12.4	8.5	5.1	8.6	15.1	14.7	9.8	11.3	13.8	11.7	19.9	28.7	35.0	43.3	46.6
Depreciation of Project Assets	1.8	1.7	4.2	2.0	2.2	2.2	2.7	2.2	1.8	2.2	2.7	2.6	2.3	2.4	2.6	2.5	5.3	9.6	9.3	9.3	9.8
Depreciation of PPE	0.4	0.3	0.6	0.5	0.5	0.6	0.8	0.7	0.6	0.7	0.8	0.8	0.7	0.8	0.8	0.8	1.4	1.8	2.6	2.9	3.1
Amortization of Deferred Financing Fees	0.1	0.1	0.3	0.1	0.1	0.1	0.1										0.3	0.6	0.3	-	-
Amortization of Intangible Assets							0.5												0.5	-	-
Provision for Bad Debts	0.0	-	-	0.1	0.0	0.2	0.0										0.6	0.1	0.2	-	-
Gain on Sale of Assets	-	-	-	-	-	-	-										(0.7)	-	-	-	-
Write-Down of LT Receivable	(0.1)	2.1	-	-	-	-	-										(2.3)	2.0	-	-	-
Stock Based Compensation	0.4	0.7	0.7	0.7	0.9	0.7	0.4										3.2	2.5	2.0	-	-
Deferred Income Taxes	1.6	(2.4)	0.8	2.6	2.7	0.5	4.1										3.4	2.6	7.2	-	-
Excess Tax Benefits for Stock Based Compensation	-	-	-	-	(0.4)	(3.5)	(1.8)										-	-	(5.7)	-	-
Changes in Operating Assets and Liabilities																			-	-	-
Restricted Cash Draws	0.2	55.5	53.2	42.1	40.9	37.3	20.5	-	-	-	-	-	-	-	-	-	33.1	151.0	98.7	-	-
Accounts Receivable	10.9	(13.9)	(21.1)	22.8	(7.6)	(5.1)	(45.3)	54.3	14.5	(13.4)	(21.9)	2.0	14.1	(4.1)	(10.3)	7.2	(11.0)	(1.3)	(3.7)	(18.6)	6.9
Accounts Receivable Retainage	(3.3)	1.0	(5.2)	3.1	1.4	(1.1)	(0.9)	(3.8)	3.6	(3.3)	(5.5)	0.5	3.5	(1.0)	(2.6)	1.8	5.0	(4.4)	(4.4)	(4.7)	1.7
Federal ESPC Receivable	1.9	(60.5)	(51.8)	(51.1)	(36.5)	(37.1)	(21.9)	11.4	-	22.9	22.9	22.9	22.9	22.9	22.9	22.9	(52.9)	(161.6)	(84.1)	68.8	91.7
Inventory	(0.5)	(0.6)	0.0	(1.5)	(1.6)	(0.3)	0.4	(1.6)	1.6	(1.5)	(2.4)	0.2	1.5	(0.4)	(1.1)	0.8	3.2	(2.5)	(3.1)	(2.0)	0.8
Costs and Estimated Earnings in Excess of Billings	(2.7)	(5.1)	(8.9)	(6.8)	(6.1)	(4.8)	2.3	-	-	-	-	-	-	-	-	-	(3.7)	(23.5)	(8.6)	-	-
Prepaid Expenses and other Current Assets	(3.5)	(0.2)	(1.8)	0.4	(0.0)	(0.6)	(1.1)	0.3	1.6	(1.5)	(2.4)	0.2	1.5	(0.4)	(1.1)	0.8	(1.6)	(5.2)	(1.5)	(2.0)	0.8
Project Development Costs	0.1	(0.1)	(0.9)	1.7	0.9	(0.2)	(1.4)	-	-	-	-	-	-	-	-	-	2.0	0.9	(0.6)	-	-
Other Assets	1.2	0.8	4.6	0.8	0.6	(0.8)	(1.6)	-	-	-	-	-	-	-	-	-	3.8	7.4	(1.8)	-	-
Accounts Payable and Accrued Expenses	(28.1)	8.9	25.9	2.9	(23.2)	(0.7)	38.9	(28.6)	(14.2)	13.2	20.9	(2.1)	(13.3)	3.5	10.0	(7.2)	27.3	9.7	(13.6)	17.9	(6.9)
Billings in Excess of Cost and Estimated Earnings	(0.7)	4.4	(1.3)	(3.6)	(4.5)	4.2	4.5	-	-	-	-	-	-	-	-	-	6.8	(1.3)	4.2	-	-
Other Liabilities	0.9	0.7	0.3	4.0	4.3	0.4	(4.7)	-	-	-	-	-	-	-	-	-	0.0	5.9	0.1	-	-
Income Taxes Payable	0.3	1.3	(2.5)	0.7	(5.4)	0.8	1.4	-	-	-	-	-	-	-	-	-	2.3	(0.3)	(3.3)	-	-
Net Cash Provided by Operating Activities	**(17.9)**	**2.5**	**9.1**	**29.3**	**(25.6)**	**1.6**	**10.3**	**43.4**	**14.7**	**27.8**	**30.4**	**42.0**	**43.2**	**35.0**	**35.0**	**41.4**	**45.3**	**22.8**	**29.6**	**114.9**	**154.5**
Investing Activities																					
Purchases of Property and Equipment	(0.4)	(0.1)	(0.9)	(1.3)	(0.9)	(0.9)	(0.9)	(0.7)	(0.6)	(0.7)	(0.9)	(0.9)	(0.7)	(0.8)	(0.9)	(0.8)	(1.8)	(2.6)	(3.4)	(3.0)	(3.2)
Purchases of Project Assets	(5.9)	(6.5)	(12.4)	(12.2)	(6.6)	(8.1)	(16.8)	(13.7)	(11.5)	(13.5)	(16.9)	(16.6)	(14.4)	(15.0)	(16.6)	(15.5)	(19.8)	(37.0)	(45.3)	(58.5)	(61.6)
Grant Awards Received on Project Assets	-	-	-	(0.2)	6.7	-	(61.0)										-	(0.2)	(54.3)	-	-
Acquisition, Net of Cash Received	-	-	(6.1)	-	-	-											(0.7)	(6.1)	-	-	-
Net Cash Provided by Investing Activities	**(6.3)**	**(6.6)**	**(19.4)**	**(13.6)**	**(0.8)**	**(9.0)**	**(78.7)**	**(14.4)**	**(12.1)**	**(14.2)**	**(17.8)**	**(17.4)**	**(15.2)**	**(15.8)**	**(17.5)**	**(16.3)**	**(22.3)**	**(45.9)**	**(102.9)**	**(61.5)**	**(64.8)**
Financing Activities																					
Excess Tax Benefits from Stock-Based Compensation Arrangemer	-	-	-	-	0.4	3.5	1.8										-	-	5.7	-	-
Payments of Financing Fees	(0.2)	(0.7)	(0.4)	(0.1)	(0.1)	(0.5)	(0.1)										(2.8)	(1.4)	(0.6)	-	-
Proceeds from Exercise of Options	-	0.4	59.6	0.0	1.4	2.6	0.9										0.9	60.1	4.9	-	-
Repurchase of Stock	-	(0.8)	-	-	-	-	-										(0.9)	(0.8)	-	-	-
Proceeds from Senior Secured Credit Facility	5.0	6.4	(31.4)	-	5.0	35.0	41.6										(14.6)	(19.9)	81.6	-	-
Proceeds from LT Debt Financing	0.8	-	-	(0.1)	5.5	-											28.2	0.7	5.5	-	-
Restricted Cash	(4.3)	(0.5)	(1.1)	(0.3)	(0.6)	(1.1)	(1.1)										(3.1)	(6.3)	(2.8)	-	-
Repayment of Subordinated Debt	-	-	(3.0)	-	-	-											-	(3.0)	-	-	-
Payments of LT Debt	(1.3)	(3.5)	(5.8)	(0.3)	(0.9)	(1.6)	(1.4)	(5.5)	(25.5)	(25.5)	(25.5)	(25.5)	(25.5)	(25.5)	(25.5)	(25.5)	(3.6)	(10.9)	(9.5)	(102.2)	(102.2)
Net Cash Provided by Financing Activities	**(0.0)**	**1.4**	**18.0**	**(0.8)**	**10.8**	**37.9**	**41.6**	**(5.5)**	(25.5)	**(25.5)**	**(25.5)**	**(25.5)**	**(25.5)**	**(25.5)**	**(25.5)**	**(25.5)**	**4.1**	**18.6**	**84.8**	**(102.2)**	**(102.2)**
Effect of foreign exchange rates on cash and cash equivalents	0.7	(0.5)	0.5	0.7	0.3	0.0	(1.3)			-	-	-		-	-	-	2.7	1.3	(1.0)		
Net increase in cash and cash equivalents	(23.6)	(3.2)	8.1	15.5	(15.3)	30.4	(28.0)	23.4	(23.0)	(12.0)	(12.9)	(1.0)	2.5	(6.4)	(8.0)	(0.5)	29.8	(3.2)	10.5	(48.8)	(12.4)
Cash and cash equivalents at beginning of period	47.9	24.4	21.1	29.3	44.7	29.3	59.8	31.7	55.1	32.2	20.2	7.3	6.3	8.8	2.4	(5.6)	18.1	47.9	44.8	55.2	6.4
Cash and cash equivalents at end of period	24.4	21.1	29.3	44.8	29.3	59.8	31.7	55.1	32.2	20.2	7.3	6.3	8.8	2.4	(5.6)	(6.1)	47.9	44.8	55.2	6.4	(6.0)
Check		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Assumptions																					
Depreciation of Project Assets (% of revenue)	1.7%	1.2%	2.2%	1.1%	1.5%	1.4%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%					
Depreciation of PPE (% of revenue)	0.4%	0.2%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%					
Purchases of Property and Equipment (% of revenue)	0.4%	0.0%	0.5%	0.7%	0.6%	0.6%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%					
Purchases of Project Assets (% of revenue)	5.6%	4.6%	6.5%	6.8%	4.5%	4.9%	7.4%	7.4%	7.4%	7.4%	7.4%	7.4%	7.4%	7.4%	7.4%	7.4%					

Source: Company reports, Barclays Capital estimates

Figure 167: ELT– Historical and Projected Income Statement

($ millions except per share data)	Mar-10 1Q	Jun-10 2Q	Sep-10 3Q	Dec-10 4Q	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE
INCOME STATEMENT																				
Total Revenues	**398.2**	**433.1**	**451.3**	**476.8**	**443.9**	**486.7**	**464.4**	**481.1**	**456.4**	**470.5**	**487.8**	**507.8**	**484.9**	**499.2**	**511.5**	**528.4**	**1,759.4**	**1,876.1**	**1,922.6**	**2,023.9**
% Growth - QoQ	-12%	9%	4%	6%	-7%	10%	-5%	4%	-5%	3%	4%	4%	-5%	3%	2%	3%				
% Growth - YoY			11%	6%	11%	12%	3%	1%	3%	-3%	5%	6%	6%	6%	5%	4%	4%	7%	2%	5%
Cost of Revenue:	281.0	293.6	310.6	323.3	297.5	328.1	318.3	331.9	314.9	324.7	336.6	349.4	334.6	341.9	350.4	361.9	1,208.5	1,275.8	1,325.6	1,388.8
Gross Profit (loss)	117.2	139.5	140.7	153.5	146.5	158.5	146.1	149.1	141.5	145.9	151.2	158.4	150.3	157.2	161.1	166.4	550.9	600.2	597.0	635.1
Operating expenses																				
Selling Expenses	40.1	40.7	41.4	43.4	44.1	47.3	45.3	46.7	45.7	46.2	49.0	50.4	49.9	50.9	51.9	53.0	165.6	183.4	191.3	205.7
General and Administrative	36.5	33.4	23.7	30.2	37.1	36.9	30.7	32.2	31.6	30.3	29.7	30.9	32.1	30.2	28.7	29.3	123.8	136.9	122.5	120.3
Research and Development	20.7	20.7	22.6	23.5	26.2	27.3	25.1	25.6	25.9	26.1	26.6	26.9	27.2	26.9	27.2	27.7	87.5	104.2	105.5	109.0
Other Operating Income (Expense)	(2.0)	2.4	(5.8)	3.4	(1.6)	0.5	(0.2)										(2.0)	(1.3)	-	-
Total Operating Expenses	95.4	97.2	81.9	100.5	105.8	112.0	100.9	104.5	103.2	102.6	105.3	108.2	109.2	108.0	107.8	110.0	374.9	423.2	419.4	435.1
Operating Income / (Loss)	**21.8**	**42.4**	**58.8**	**53.0**	**40.6**	**46.6**	**45.2**	**44.6**	**38.3**	**43.2**	**45.9**	**50.2**	**41.1**	**49.2**	**53.3**	**56.5**	**176.0**	**177.0**	**177.7**	**200.0**
Total Non-GAAP Charges	13.4	6.3	(4.8)	2.9	(0.3)	1.0	0.8										17.8	1.5	-	-
Adjusted EBIT	**35.7**	**52.5**	**54.5**	**56.6**	**41.5**	**48.5**	**46.6**	**44.6**	**38.3**	**43.2**	**45.9**	**50.2**	**41.1**	**49.2**	**53.3**	**56.5**	**193.8**	**191.9**	**177.7**	**200.0**
Adjusted EBITDA	**57.4**	**73.4**	**75.7**	**78.4**	**62.1**	**70.0**	**67.6**	**66.4**	**59.0**	**64.5**	**68.0**	**73.2**	**63.0**	**71.8**	**76.4**	**80.4**	**279.4**	**276.8**	**264.6**	**291.6**
Interest Expense	(21.5)	(16.9)	(10.2)	(11.6)	(6.9)	(12.1)	(11.7)	(8.0)	(7.0)	(7.0)	(6.0)	(6.0)	(5.0)	(5.0)	(5.0)	(5.0)	(60.2)	(38.7)	(26.0)	(20.0)
Loss on Extinguishment of Debt	-	-	-	-	0.0	(13.4)		-	-	-	-	-	-	-	-	-	-	(13.4)	-	-
Other Income (Expense), Net	0.5	1.2	0.5	0.7	1.1	1.0	0.6	0.3	0.3	0.4	0.5	0.7	0.7	0.8	0.9	1.1	2.9	3.0	1.9	3.4
Total Non Operating Income/ (Loss)	(21.0)	(15.7)	(9.7)	(10.9)	(5.7)	(24.6)	(11.1)	(7.7)	(6.7)	(6.6)	(5.5)	(5.3)	(4.3)	(4.2)	(4.1)	(3.9)	(57.3)	(49.1)	(24.1)	(16.6)
Pretax Income / (Loss)	0.8	26.7	49.1	42.1	35.0	22.0	34.1	36.9	31.7	36.7	40.4	44.9	36.7	45.0	49.2	52.5	118.7	127.9	153.6	183.4
Provision for income taxes	(1.4)	(9.7)	(11.4)	(6.9)	(10.1)	(6.9)	(8.7)	(9.2)	(7.9)	(9.2)	(10.1)	(11.2)	(9.2)	(11.2)	(12.3)	(13.1)	(29.4)	(34.9)	(38.4)	(45.9)
Net income from Continuing Operations / (loss)	**(0.6)**	**17.0**	**37.7**	**35.2**	**24.9**	**15.0**	**25.4**	**27.7**	**23.7**	**27.5**	**30.3**	**33.6**	**27.6**	**33.7**	**36.9**	**39.4**	**89.3**	**93.0**	**115.2**	**137.6**
Net Income from Discontinued Operations	0.0	2.6	-	-	-	-	(0.7)										2.6	(0.7)	-	-
Total Non-GAAP Adjustments	5.7	5.5	-	5.6	5.1	15.5	5.1	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	16.8	31.5	23.1	23.1
Net Income	**(0.6)**	**19.6**	**37.7**	**35.2**	**24.9**	**15.0**	**24.7**	**27.7**	**23.7**	**27.5**	**30.3**	**33.6**	**27.6**	**33.7**	**36.9**	**39.4**	**91.9**	**92.3**	**115.2**	**137.6**
Net Income Attributable to Noncontrolling Interests	0.4	0.8	2.2	1.4	0.9	0.7	2.0										4.8	3.6	-	-
Net Income Attributable to Elster Group SE	**(1.0)**	**18.8**	**35.5**	**33.8**	**23.9**	**14.4**	**22.7**	**27.7**	**23.7**	**27.5**	**30.3**	**33.6**	**27.6**	**33.7**	**36.9**	**39.4**	**87.1**	**88.7**	**115.2**	**137.6**
Adjusted Net Income	**5.1**	**22.5**	**37.7**	**40.8**	**30.0**	**30.5**	**30.5**	**33.5**	**29.5**	**33.3**	**36.1**	**39.4**	**33.3**	**39.5**	**42.7**	**45.2**	**106.1**	**124.5**	**138.3**	**160.7**
Adjuted EPS - Diluted	**0.08**	**0.35**	**0.58**	**0.36**	**0.27**	**0.27**	**0.27**	**0.30**	**0.26**	**0.29**	**0.32**	**0.35**	**0.29**	**0.35**	**0.38**	**0.40**	**1.37**	**1.10**	**1.22**	**1.41**
ADS Shares Outstanding (Basic)	65.3	65.3	65.3	112.9	112.9	112.9	112.9	113.0	113.1	113.2	113.3	113.4	113.5	113.6	113.7	113.8	77.2	112.9	113.2	113.6
ADS Shares Outstanding (Diluted)	65.3	65.3	65.3	112.9	113.0	113.0	113.0	113.1	113.2	113.3	113.4	113.5	113.6	113.7	113.8	113.9	77.2	113.0	113.3	113.7
Margin Analysis																				
Gross Margin	29.4%	32.2%	31.2%	32.2%	33.0%	32.6%	31.5%	31.0%	31.0%	31.0%	31.0%	31.2%	31.0%	31.5%	31.5%	31.5%	31.3%	32.0%	31.1%	31.4%
Selling	10.1%	9.4%	9.2%	9.1%	9.9%	9.7%	9.8%	9.7%	10.0%	9.8%	10.0%	9.9%	10.3%	10.2%	10.2%	10.0%	9.4%	9.8%	9.9%	10.2%
General and Administrative	9.2%	7.7%	5.3%	6.3%	8.4%	7.6%	6.6%	6.7%	6.9%	6.4%	6.1%	6.1%	6.6%	6.1%	5.6%	5.5%	7.0%	7.3%	6.4%	5.9%
R&D	5.2%	4.8%	5.0%	4.9%	5.9%	5.6%	5.4%	5.3%	5.7%	5.6%	5.5%	5.3%	5.6%	5.4%	5.3%	5.2%	5.0%	5.6%	5.5%	5.4%
Operating Expenses	23.9%	22.4%	18.1%	21.1%	23.8%	23.0%	21.7%	21.7%	22.6%	21.8%	21.6%	21.3%	22.5%	21.6%	21.1%	20.8%	21.3%	22.6%	21.8%	21.5%
Operating Margin	5.5%	9.8%	13.0%	11.1%	9.2%	9.6%	9.7%	9.3%	8.4%	9.2%	9.4%	9.9%	8.5%	9.9%	10.4%	10.7%	10.0%	9.4%	9.2%	9.9%
Pretax income	0.2%	6.2%	10.9%	8.8%	7.9%	4.5%	7.3%	7.7%	6.9%	7.8%	8.3%	8.8%	7.6%	9.0%	9.6%	9.9%	6.7%	6.8%	8.0%	9.1%
Tax Rate	179.2%	36.2%	23.2%	16.4%	28.8%	31.6%	25.5%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	24.8%	27.3%	25.0%	25.0%
Net Margin	-0.2%	4.5%	8.4%	7.4%	5.6%	3.1%	5.3%	5.8%	5.2%	5.8%	6.2%	6.6%	5.7%	6.8%	7.2%	7.5%	5.2%	4.9%	6.0%	6.8%
QoQ Increase																				
Selling	-5.6%	1.4%	1.8%	4.8%	1.7%	7.1%	-4.1%	3.0%	-2.0%	1.0%	6.0%	3.0%	-1.0%	2.0%	2.0%	2.0%				
General and Administrative	74.0%	-8.7%	-29.0%	27.4%	22.8%	-0.5%	-16.8%	5.0%	-2.0%	-4.0%	-2.0%	4.0%	4.0%	-6.0%	-5.0%	2.0%				
Research and Development	1.3%	0.3%	9.0%	4.0%	11.4%	4.4%	-8.1%	2.0%	1.0%	1.0%	2.0%	1.0%	1.0%	-1.0%	1.0%	2.0%				
Other Operating Income (Expense)	1877.0%	-220.2%	-344.0%	-158.6%	-146.9%	-130.9%	-140.6%													

Source: Company reports, Barclays Capital estimates

Figure 168: ELT– Historical and Projected Revenues by Segment

($ millions except per share data)	Mar-10 1Q	Jun-10 2Q	Sep-10 3Q	Dec-10 4Q	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE
PERFORMANCE BY SEGMENT																				
Revenues																				
Gas	218.6	223.84	236.8	264.8	255.7	275.1	276.4	270.9	262.7	270.6	281.5	295.5	283.7	289.4	295.2	309.9	943.8	1,078.1	1,110.4	1,178.2
Electricity	90.6	115.9	117.7	127.3	99.4	117.3	105.1	128.2	109.0	113.3	117.9	129.7	116.7	122.5	126.2	131.3	451.50	450.0	469.9	496.7
Water	94.0	99.9	101.6	88.4	96.4	102.4	91.2	90.3	93.0	94.9	96.8	90.9	92.8	95.6	98.4	95.5	383.9	380.3	375.6	382.2
Thereof to Other Segments	(4.9)	(6.5)	(4.8)	(3.7)	(7.6)	(8.1)	(8.3)	(8.3)	(8.3)	(8.3)	(8.3)	(8.3)	(8.3)	(8.3)	(8.3)	(8.3)	(19.9)	(32.3)	(33.2)	(33.2)
Total Revenues	398.2	433.2	451.3	476.8	443.9	486.7	464.4	481.1	456.4	470.5	487.8	507.8	484.9	499.2	511.5	528.4	1,759.3	1,876.1	1,922.6	2,023.9
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
% of Segment Revenues - Net of 'thereof to other segments'																				
Gas	54.2%	50.9%	51.9%	55.1%	56.6%	55.6%	58.5%	55.3%	56.5%	56.5%	56.7%	57.3%	57.5%	57.0%	56.8%	57.8%	53.0%	56.5%	56.8%	57.3%
Electricity	22.5%	26.4%	25.8%	26.5%	22.0%	23.7%	22.2%	26.2%	23.5%	23.7%	23.8%	25.1%	23.7%	24.1%	24.3%	24.5%	25.4%	23.6%	24.0%	24.1%
Water	23.3%	22.7%	22.3%	18.4%	21.4%	20.7%	19.3%	18.4%	20.0%	19.8%	19.5%	17.6%	18.8%	18.8%	18.9%	17.8%	21.6%	19.9%	19.2%	18.6%
Total Revenues	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% QoQ																				
Gas	-0.5%	2.4%	5.8%	11.8%	-3.4%	7.6%	0.5%	-2.0%	-3.0%	3.0%	4.0%	5.0%	-4.0%	2.0%	2.0%	5.0%				
Electricity	-36.9%	27.9%	1.5%	8.2%	-21.9%	18.0%	-10.4%	22.0%	-15.0%	4.0%	4.0%	10.0%	-10.0%	5.0%	3.0%	4.0%				
Water	4.3%	6.3%	1.7%	-13.0%	9.0%	6.2%	-10.9%	-1.0%	3.0%	2.0%	2.0%	-6.0%	2.0%	3.0%	3.0%	-3.0%				
Total Revenues	-11.6%	8.8%	4.2%	5.7%	-6.9%	9.6%	-4.6%	3.6%	-5.1%	3.1%	3.7%	4.1%	-4.5%	2.9%	2.5%	3.3%				
% YoY																				
Gas			7.0%	20.6%	17.0%	22.9%	16.7%	2.3%	2.8%	-1.6%	1.8%	9.1%	8.0%	6.9%	4.9%	4.9%	4.9%	14.2%	3.0%	6.1%
Electricity			15.5%	-11.4%	9.7%	1.2%	-10.7%	0.7%	9.6%	-3.4%	12.2%	1.1%	7.1%	8.1%	7.1%	1.2%	-0.4%	-0.3%	4.4%	5.7%
Water			14.4%	-1.9%	2.6%	2.5%	-10.2%	2.1%	-3.5%	-7.4%	6.1%	0.7%	-0.2%	0.7%	1.7%	5.0%	7.9%	-0.9%	-1.2%	1.8%
Total Revenues			10.7%	5.9%	11.5%	12.4%	2.9%	0.9%	2.8%	-3.3%	5.0%	5.6%	6.2%	6.1%	4.9%	4.0%	3.8%	6.6%	2.5%	5.3%

Source: Company reports, Barclays Capital estimates

Figure 169: ELT– Historical and Projected Balance Sheet

	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FYE	FYE	FYE
BALANCE SHEET																
ASSETS																
Current Assets																
Cash and Cash Equivalents	266.8	129.9	119.3	133.9	174.2	201.5	262.1	266.1	314.9	348.6	420.7	460.5	216.3	133.9	266.1	460.5
Accounts Receivable	303.2	322.7	293.7	316.3	305.1	314.5	294.0	333.9	318.8	328.2	302.7	312.7	292.4	316.3	333.9	312.7
Inventories	168.1	174.4	168.9	176.1	167.1	172.3	178.6	185.4	177.5	181.4	185.9	192.0	154.5	176.1	185.4	192.0
Other Current Assets	111.6	100.8	93.9	93.9	93.9	93.9	93.9	93.9	93.9	93.9	93.9	93.9	104.5	93.9	93.9	93.9
Total Current Assets	**849.7**	**727.8**	**675.8**	**720.2**	**740.4**	**782.2**	**828.6**	**879.3**	**905.1**	**952.2**	**1,003.2**	**1,059.1**	**767.7**	**720.2**	**879.3**	**1,059.1**
Property, Plant and Equipment, net	210.5	212.1	202.0	193.9	186.3	178.4	170.2	161.6	153.5	145.1	136.5	127.6	202.9	193.9	161.6	127.6
Other Intangible Assets, net	213.9	206.5	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	216.4	189.2	189.2	189.2
Goodwill	972.7	983.1	942.6	942.6	942.6	942.6	942.6	942.6	942.6	942.6	942.6	942.6	937.0	942.6	942.6	942.6
Other Noncurrent Assets	47.4	63.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	40.2	59.4	59.4	59.4
Total Assets	**2,294.2**	**2,192.9**	**2,069.0**	**2,105.3**	**2,117.8**	**2,151.8**	**2,190.0**	**2,232.1**	**2,249.8**	**2,288.5**	**2,330.9**	**2,378.0**	**2,164.2**	**2,105.3**	**2,232.1**	**2,378.0**
LIABILITIES																
Current Liabilities																
Pension and other LT Employee Benefit, Current	13.9	14.0	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.5	13.6	13.6	13.6
Payroll, Bonuses and Related Accruals	62.5	60.5	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	57.8	58.0	58.0	58.0
ST Debt, and Current Portion of LT Debt	28.4	18.7	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	18.0	17.8	17.8	17.8
Accounts Payable	224.9	231.2	210.9	219.9	208.7	215.1	223.0	231.5	221.7	226.6	232.2	239.8	204.3	219.9	231.5	239.8
Warranties	32.4	34.7	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	31.6	32.2	32.2	32.2
Deferred Tax Liabilities	7.4	7.3	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	6.7	7.2	7.2	7.2
Other Current Liabilities	101.1	103.3	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	96.4	113.0	113.0	113.0
Total Current Liabilities	**470.6**	**469.7**	**452.7**	**461.7**	**450.5**	**456.9**	**464.8**	**473.3**	**463.5**	**468.4**	**474.0**	**481.6**	**428.3**	**461.7**	**473.3**	**481.6**
Pension and other LT Employee Benefit, Less Current	143.7	145.4	137.2	137.2	137.2	137.2	137.2	137.2	137.2	137.2	137.2	137.2	137.5	137.2	137.2	137.2
Payroll, Bonuses and Related Accruals	1.4	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.4	1.4	1.4
Long-Term Debt, Net of Current Portion	852.6	728.4	641.8	641.8	641.8	641.8	641.8	641.8	641.8	641.8	641.8	641.8	822.4	641.8	641.8	641.8
Shareholder Loan	-	-	-	-									-	-	-	-
Deferred Tax Liabilities	67.2	66.6	65.4	65.4	65.4	65.4	65.4	65.4	65.4	65.4	65.4	65.4	60.7	65.4	65.4	65.4
Other Non-Current Liabilities	61.9	62.9	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	57.8	60.0	60.0	60.0
Total Liabilities	**1,597.4**	**1,474.5**	**1,358.5**	**1,367.5**	**1,356.3**	**1,362.7**	**1,370.6**	**1,379.1**	**1,369.3**	**1,374.2**	**1,379.8**	**1,387.4**	**1,508.0**	**1,367.5**	**1,379.1**	**1,387.4**
Total Shareholders' Equity	**696.8**	**718.4**	**710.3**	**738.0**	**761.7**	**789.2**	**819.6**	**853.2**	**880.8**	**914.5**	**951.4**	**990.8**	**656.2**	**738.0**	**853.2**	**990.8**
Total Liabilities, redeemable stock and shareholders' equity	**2,294.2**	**2,192.9**	**2,068.8**	**2,105.5**	**2,118.0**	**2,152.0**	**2,190.2**	**2,232.3**	**2,250.0**	**2,288.7**	**2,331.1**	**2,378.2**	**2,164.2**	**2,105.5**	**2,232.3**	**2,378.2**
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Days In																
Accounts Receivables, net	62.3	60.5	57.7	60.0	61.0	61.0	55.0	60.0	60.0	60.0	54.0	54.0	60.7	61.5	63.4	56.4
Inventories	51.6	48.5	48.4	48.4	48.4	48.4	48.4	48.4	48.4	48.4	48.4	48.4	46.7	50.4	51.1	50.5
Inventory Turns	7.4	7.7	7.4	7.7	7.3	7.7	7.7	7.7	7.4	7.6	7.6	7.7	8.0	7.7	7.3	7.4
Accounts Payable	69.0	64.3	60.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5	17.5	16.6	16.0	15.2
Valuation Ratios																
Return on Equity	14.3%	8.4%	13.9%	15.0%	12.5%	13.9%	14.8%	15.8%	12.5%	14.8%	15.5%	15.9%	14.0%	12.5%	13.5%	13.9%
Return on Average Equity (LTM)	4.2%	3.9%	3.5%	3.1%	3.0%	3.3%	3.3%	3.4%	3.4%	3.4%	3.5%	3.5%				
Return on Assets	4.3%	2.7%	4.8%	5.3%	4.5%	5.1%	5.5%	6.0%	4.9%	5.9%	6.3%	6.6%	4.2%	4.4%	5.2%	5.8%
Return on Net Assets	14.3%	8.4%	13.9%	15.0%	12.5%	13.9%	14.8%	15.8%	12.5%	14.8%	15.5%	15.9%	14.0%	12.5%	13.5%	13.9%
Return on Sales	5.6%	3.1%	5.3%	5.8%	5.2%	5.8%	6.2%	6.6%	5.7%	6.8%	7.2%	7.5%	5.2%	4.9%	6.0%	6.8%
Liquidity Ratios																
Current Ratio	1.8	1.5	1.5	1.6	1.6	1.7	1.8	1.9	2.0	2.0	2.1	2.2	1.8	1.6	1.9	2.2
Net Working Capital	112.3	128.2	103.8	124.6	115.7	123.8	101.7	139.9	126.8	135.2	108.6	117.0	123.1	124.6	139.9	117.0
Long Term Debt / Equity	122.4%	101.4%	90.4%	87.0%	84.3%	81.3%	78.3%	75.2%	72.9%	70.2%	67.5%	64.8%	125.3%	0.9	0.8	0.6
Total Debt / Equity	126.4%	104.0%	0.9	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.7	0.7	128.1%	0.9	0.8	0.7
Total Debt / Total Capital	55.8%	51.0%	48.1%	47.2%	46.4%	45.5%	44.6%	43.6%	42.8%	41.9%	40.9%	40.0%	56.2%	47.2%	43.6%	0.4
Book Value Per Share	6.2	6.4	6.3	6.5	6.7	7.0	7.2	7.5	7.8	8.0	8.4	8.7	8.5	6.5	7.5	8.7
Cash Per Share	2.4	1.2	1.1	1.2	1.5	1.8	2.3	2.3	2.8	3.1	3.7	4.0	2.8	1.2	2.3	4.1
Net Debt	614.2	617.2	540.3	525.7	485.4	458.1	397.5	393.5	344.7	311.0	238.9	199.1				
Net Debt Per Share	5.4	5.5	4.8	4.7	4.3	4.0	3.5	3.5	3.0	2.7	2.1	1.7				

Source: Company reports, Barclays Capital estimates

Figure 170: ELT– Historical and Projected Statement of Cash Flows

	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FYE	FYE	FYE
CASH FLOW STATEMENT																
Net Cash Provided by Operating Activities	**47.2**	**27.9**	**78.9**	**28.6**	**53.3**	**40.6**	**74.5**	**18.4**	**62.6**	**47.9**	**86.7**	**54.8**	**141.4**	**182.6**	**186.8**	**252.0**
Investing Activities																
Purchases of PPE and intangible assets	(10.9)	(12.3)	(13.2)	(13.7)	(13.0)	(13.4)	(13.9)	(14.4)	(13.8)	(14.2)	(14.5)	(15.0)	(42.4)	(50.1)	(54.6)	(57.5)
Proceeds from Sale of PPE and intangible assets	0.8	1.1	1.1										11.9	3.0	-	-
Proceeds from shareholder loan payments	-	-	-										2.5	-	-	-
Business combinations, net of cash acquired	-	-	-										-	-	-	-
Net Cash Provided by Investing Activities	**(10.1)**	**(11.2)**	**(12.1)**	**(13.7)**	**(13.0)**	**(13.4)**	**(13.9)**	**(14.4)**	**(13.8)**	**(14.2)**	**(14.5)**	**(15.0)**	**(28.0)**	**(47.1)**	**(54.6)**	**(57.5)**
Financing Activities																
Proceeds from issuance of Senior Notes	-	364.6	(0.2)											364.4	-	-
Proceeds from bank borrowings	7.4	404.6	18.7										63.6	430.7	-	-
Payment of Deferred Financing Costs	-	(20.6)	-											(20.6)	-	-
Repayment of bank borrowing/LT Debt	-	(900.6)	(86.9)	-	-	-	-	-	-	-	-	-	(184.8)	(987.5)	-	-
Capital increase, net of IPO costs	-	-	-										153.3	-	-	-
Repayment of capital lease obligations	(0.3)	-	-										(1.1)	(0.3)	-	-
Repayment of shareholder loan	-	-	-										(6.8)	-	-	-
Dividends to non-controlling interests	(6.3)	(0.1)	(0.5)										(0.8)	(6.9)	-	-
Sale of non-controlling interest in subsidiary	-	-	-										2.0	-	-	-
Net Cash Provided by Financing Activities	**0.8**	**(152.1)**	**(68.9)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**25.4**	**(220.2)**	**-**	**-**
Effect of foreign exchange rates on cash and cash equivalents	12.5	(1.4)	(8.9)										2.0	2.2	-	-
Net increase in cash and cash equivalents	50.4	(136.8)	(11.0)	15.0	40.4	27.3	60.6	4.0	48.8	33.7	72.1	39.8	140.8	(82.4)	132.2	194.5
Cash and cash equivalents at beginning of period	216.3	266.7	129.9	118.9	133.9	174.2	201.5	262.1	266.1	314.9	348.6	420.7	75.4	216.2	133.8	266.0
Cash and cash equivalents at end of period	266.7	129.9	118.9	133.9	174.2	201.5	262.1	266.1	314.9	348.6	420.7	460.5	216.2	133.8	266.0	460.5
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Assumptions																
Depcreciation (% of Revenue)	4.6%	4.4%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%				
PPE and Intangible Assets (% of Revenue)	2.5%	2.5%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%				
Supplemental Information																
Income taxes paid	5.9	14.3											28.7			
Interest paid	4.2	15.9											50.1			
Free Cash Flow Calculation																
Net Income	24.9	15.0	24.7	27.7	23.7	27.5	30.3	33.6	27.6	33.7	36.9	39.4	91.9	92.3	115.2	137.6
+ Depreciation and Amortization	-	-	-	21.8	20.6	21.3	22.1	23.0	21.9	22.6	23.1	23.9	87.9	21.8	86.9	91.5
- Changes in Net Working Capital	(10.8)	15.9	(24.4)	20.8	(9.0)	8.1	(22.1)	38.2	(13.1)	8.4	(26.6)	8.5	14.0	1.5	15.3	(22.9)
- Capital Expenditures	(10.9)	(12.3)	(13.2)	(13.7)	(13.0)	(13.4)	(13.9)	(14.4)	(13.8)	(14.2)	(14.5)	(15.0)	(42.4)	(50.1)	(54.6)	(57.5)
= Free Cash Flow	46.6	11.4	62.3	42.3	66.3	54.0	88.3	32.8	76.4	62.1	101.2	69.8	208.2	162.6	241.5	309.5
Free Cash Flow Per Share	0.4	0.1	0.6	0.4	0.6	0.5	0.8	0.3	0.7	0.5	0.9	0.6	2.7	1.4	2.1	2.7

Source: Company reports, Barclays Capital estimates

Figure 171: FSLR– Historical and Projected Income Statement

	Mar-10	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FYE	FYE	FYE
INCOME STATEMENT																					
Total Revenues	**568.0**	**587.9**	**797.9**	**609.8**	**567.3**	**532.8**	**1,005.8**	**1,173.2**	**896.3**	**1,020.0**	**1,131.4**	**1,213.8**	**1,043.8**	**1,148.2**	**1,193.3**	**1,282.0**	**2,066.2**	**2,563.5**	**3,279.1**	**4,261.4**	**4,667.2**
% Growth - QoQ	-11%	4%	36%	-24%	-7%	-6%	89%	17%	-24%	14%	11%	7%	-14%	10%	4%	7%					
% Growth - YoY	36%	12%	66%	-5%	0%	-9%	26%	92%	58%	91%	12%	3%	16%	13%	5%	6%	66%	24%	28%	30%	10%
Cost of Revenue:	285.9	303.7	476.0	313.1	307.6	338.0	626.6	721.9	574.5	670.8	736.6	776.5	698.1	764.3	772.5	853.1	1,021.6	1,378.7	1,994.1	2,758.4	3,087.9
Gross Profit (loss)	282.0	284.2	321.9	296.7	259.7	194.8	379.2	451.3	321.7	349.2	394.8	437.3	345.7	383.9	420.7	428.9	1,044.6	1,184.8	1,285.0	1,503.1	1,579.2
Operating expenses																					
Research and Development	22.9	22.8	21.5	27.6	31.4	33.1	38.2	42.0	45.8	49.5	50.5	56.6	61.7	60.4	61.6	64.7	78.2	94.8	144.6	202.4	248.4
Selling, General and Administrative	66.9	78.6	85.0	91.3	87.0	86.9	112.7	115.0	110.4	108.2	113.6	119.3	113.3	107.6	113.0	117.6	272.9	321.7	401.6	451.5	451.6
Production Start-Up	1.1	2.3	3.8	12.2	11.9	10.3	5.5	8.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	13.9	19.4	35.7	20.0	20.0
Total Operating Expenses	90.9	103.7	110.3	131.1	130.3	130.3	156.4	165.0	161.2	162.7	169.1	180.8	180.0	173.1	179.7	187.3	365.0	435.9	581.9	673.9	720.0
Operating Income / (Loss)	**191.1**	**180.5**	**211.6**	**165.7**	**129.4**	**64.5**	**222.7**	**286.4**	**160.5**	**186.5**	**225.7**	**256.5**	**165.7**	**210.8**	**241.1**	**241.7**	**679.6**	**748.9**	**703.0**	**829.2**	**859.3**
Other income (expense), net	4.2	(0.0)	1.3	7.7	3.6	7.4	0.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	6.7	13.2	11.7	2.6	2.6
Pretax Income / (Loss)	195.4	180.4	212.9	173.4	133.0	72.0	222.8	287.0	161.1	187.2	226.4	257.1	166.3	211.5	241.7	242.3	686.3	762.1	714.7	831.8	861.9
Provision for income taxes	23.0	21.4	36.0	17.4	17.0	10.8	26.3	43.1	24.2	28.1	34.0	38.6	25.0	31.7	36.3	36.3	46.2	97.9	97.2	124.8	129.3
Net income / (loss)	**172.3**	**159.0**	**176.9**	**155.9**	**116.0**	**61.1**	**196.5**	**244.0**	**137.0**	**159.1**	**192.4**	**218.5**	**141.4**	**179.8**	**205.5**	**206.0**	**640.1**	**664.2**	**617.6**	**707.0**	**732.6**
EPS - Basic	2.04	1.87	2.08	1.83	1.36	0.71	2.28	2.83	1.59	1.84	2.23	2.53	1.64	2.08	2.38	2.39	7.67	7.82	7.18	8.19	8.49
EPS - Diluted	**2.00**	**1.84**	**2.04**	**1.80**	**1.33**	**0.70**	**2.25**	**2.74**	**1.54**	**1.79**	**2.16**	**2.46**	**1.59**	**2.02**	**2.31**	**2.31**	**7.53**	**7.68**	**7.05**	**7.94**	**8.23**
Weighted average number of common shares outstandin	84.5	84.9	85.1	85.2	85.3	86.2	86.3	86.3	86.3	86.3	86.3	86.3	86.3	86.3	86.3	86.3	83.5	84.9	86.0	86.3	86.3
Weighted average number of common shares outstandin	86.1	86.4	86.6	86.8	87.1	87.1	87.2	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	85.0	86.5	87.6	89.0	89.0
Margin Analysis																					
Gross Margin	49.7%	48.3%	40.3%	48.7%	45.8%	36.6%	37.7%	38.5%	35.9%	34.2%	34.9%	36.0%	33.1%	33.4%	35.3%	33.5%	50.6%	46.2%	39.2%	35.3%	33.8%
Selling, General and Administrative	11.8%	13.4%	10.6%	15.0%	15.3%	16.3%	11.2%	9.8%	12.3%	10.6%	10.0%	9.8%	10.9%	9.4%	9.5%	9.2%	13.2%	12.5%	12.2%	10.6%	9.7%
R&D	4.0%	3.9%	2.7%	4.5%	5.5%	6.2%	3.8%	3.6%	5.1%	4.9%	4.5%	4.7%	5.9%	5.3%	5.2%	5.0%	3.8%	3.7%	4.4%	4.7%	5.3%
Operating Expenses	16.0%	17.6%	13.8%	21.5%	23.0%	24.5%	15.6%	14.1%	18.0%	16.0%	14.9%	14.9%	17.2%	15.1%	15.1%	14.6%	17.7%	17.0%	17.7%	15.8%	15.4%
Operating Margin	33.7%	30.7%	26.5%	27.2%	22.8%	12.1%	22.1%	24.4%	17.9%	18.3%	19.9%	21.1%	15.9%	18.4%	20.2%	18.9%	32.9%	29.2%	21.4%	19.5%	18.4%
Pretax income	34.4%	30.7%	26.7%	28.4%	23.4%	13.5%	22.1%	24.5%	18.0%	18.4%	20.0%	21.2%	15.9%	18.4%	20.3%	18.9%	33.2%	29.7%	21.8%	19.5%	18.5%
Tax Rate	11.8%	11.9%	16.9%	10.0%	12.8%	15.0%	11.8%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	6.7%	12.8%	13.6%	15.0%	15.0%
Net Margin	30.3%	27.1%	22.2%	25.6%	20.4%	11.5%	19.5%	20.8%	15.3%	15.6%	17.0%	18.0%	13.5%	15.7%	17.2%	16.1%	31.0%	25.9%	18.8%	16.6%	15.7%
QoQ Increase																					
Research and Development	-3.5%	-0.2%	-6.0%	28.5%	13.6%	5.6%	15.3%	10.0%	9.2%	8.0%	2.0%	12.0%	9.0%	-2.0%	2.0%	5.0%					
Selling, General and Administrative	-30.8%	17.5%	8.1%	7.4%	-4.7%	-0.1%	29.8%	2.0%	-4.0%	-2.0%	5.0%	5.0%	-5.0%	-5.0%	5.0%	4.0%					
Production Start up	4.0%	100.2%	67.0%	219.0%	-2.1%	-13.7%	-46.4%														

Source: Company reports, Barclays Capital estimates

Figure 172: FSLR– Historical and Projected Revenues by Segment

($ millions except per share data)	Mar-10 1Q	Jun-10 2Q	Sep-10 3Q	Dec-10 4Q	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-09 FY	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE
PERFORMANCE BY SEGMENT																					
Revenues																					
Total Modules	529.3	500.9	575.5	579.5	519.5	471.9	612.7	874.4	701.3	759.0	826.9	877.8	749.8	812.2	843.3	862.0	1,965.4	2,185.2	2,478.6	3,164.9	3,267.2
EPC	38.7	86.9	222.4	30.3	47.8	60.8	393.1	298.8	195.0	261.0	304.5	336.0	294.0	336.0	350.0	420.0	100.8	378.4	800.5	1,096.5	1,400.0
Total Revenues	568.0	587.9	797.9	609.8	567.3	532.8	1,005.8	1,173.2	896.3	1,020.0	1,131.4	1,213.8	1,043.8	1,148.2	1,193.3	1,282.0	2,066.2	2,563.5	3,279.1	4,261.4	4,667.2
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
% of Sales																					
Total Modules	93.2%	85.2%	72.1%	95.0%	91.6%	88.6%	60.9%	74.5%	78.2%	74.4%	73.1%	72.3%	71.8%	70.7%	70.7%	67.2%	95.1%	85.2%	75.6%	74.3%	70.0%
EPC	6.8%	14.8%	27.9%	5.0%	8.4%	11.4%	39.1%	25.5%	21.8%	25.6%	26.9%	27.7%	28.2%	29.3%	29.3%	32.8%	4.9%	14.8%	24.4%	25.7%	30.0%
Total Revenues	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% QoQ																					
Total Modules	-3.0%	-5.4%	14.9%	0.7%	-10.3%	-9.2%	29.8%	42.7%	-19.8%	8.2%	8.9%	6.2%	-14.6%	8.3%	3.8%	2.2%					
EPC	-59.6%	124.6%	155.9%	-86.4%	57.5%	27.3%	546.2%	-24.0%	-34.7%	33.8%	16.7%	10.3%	-12.5%	14.3%	4.2%	20.0%					
Total Revenues	-11.4%	3.5%	35.7%	-23.6%	-7.0%	-6.1%	88.8%	16.6%	-23.6%	13.8%	10.9%	7.3%	-14.0%	10.0%	3.9%	7.4%					
% YoY																					
Total Modules	27.2%	-4.4%	19.8%	6.2%	-1.8%	-5.8%	6.5%	50.9%	35.0%	60.8%	35.0%	0.4%	6.9%	7.0%	2.0%	-1.8%	64.4%	11.2%	13.4%	27.7%	3.2%
EPC	1650.0%	3957.6%	37091.0%	-68.3%	23.5%	-30.0%	76.7%	884.8%	308.2%	329.1%	-22.5%	12.4%	50.8%	28.7%	14.9%	25.0%	99.5%	275.5%	111.6%	37.0%	27.7%
Total Revenues	35.8%	11.8%	65.9%	-4.9%	-0.1%	-9.4%	26.1%	92.4%	58.0%	91.5%	12.5%	3.5%	16.5%	12.6%	5.5%	5.6%	65.8%	24.1%	27.9%	30.0%	9.5%

Source: Company reports, Barclays Capital estimates

Figure 173: FSLR– Historical and Projected Balance Sheet

($ millions except per share data)	Mar-10 1Q	Jun-10 2Q	Sep-10 3Q	Dec-10 4Q	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-09 FY	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE
BALANCE SHEET																					
ASSETS																					
Current Assets																					
Cash and Cash Equivalents	420.9	510.5	621.2	765.7	355.7	357.5	678.6	913.9	1,164.2	946.7	832.8	893.4	1,101.5	973.3	983.6	1,003.6	664.5	765.7	913.9	893.4	1,003.6
Marketable Securities and Investments	293.3	286.0	212.2	167.9	199.8	107.0	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	120.2	167.9	84.4	84.4	84.4
Accounts Receivables, net	269.2	256.3	316.2	305.5	362.7	542.0	482.0	591.4	471.5	558.9	619.9	598.6	514.7	604.0	627.7	562.0	226.8	305.5	591.4	598.6	562.0
Accounts Receivables, Unbilled	25.9	105.3	148.5	1.5	10.6	63.7	325.6	64.3	9.8	22.4	24.8	26.6	-	-	-	-	-	1.5	64.3	26.6	-
Inventories	172.1	194.3	184.0	200.4	271.2	323.0	432.9	411.4	409.3	514.6	565.0	553.1	497.3	544.4	550.3	607.7	152.8	200.4	411.4	553.1	607.7
Deferred Project Costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Economic Development Funding Receivable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Project Assets	0.1	0.1	0.1	-	-	145.4	-	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-
Balance of Systems Parts	-	-	-	-	16.0	33.7	43.3	41.1	40.9	51.5	56.5	55.3	49.7	54.4	55.0	60.8	-	-	41.1	55.3	60.8
Deferred Tax Assets, Net	22.5	19.2	0.3	0.4	0.4	3.6	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	21.7	0.4	31.7	31.7	31.7
Prepaid Expenses and other current assets	200.5	244.1	132.4	143.0	177.8	260.5	352.0	556.4	442.9	517.0	567.8	598.5	538.1	589.1	595.5	657.5	164.1	143.0	556.4	598.5	657.5
Total Current Assets	**1,404.5**	**1,615.9**	**1,614.8**	**1,584.5**	**1,394.3**	**1,836.2**	**2,430.5**	**2,694.7**	**2,654.6**	**2,727.1**	**2,783.0**	**2,841.7**	**2,817.4**	**2,881.3**	**2,928.1**	**3,007.6**	**1,351.3**	**1,584.5**	**2,694.7**	**2,841.7**	**3,007.6**
Property, plant and equipment, net	1,030.2	1,094.9	1,244.6	1,430.8	1,549.5	1,728.0	1,840.3	2,011.6	2,124.5	2,253.0	2,418.2	2,595.4	2,726.9	2,871.6	3,033.9	3,195.4	988.8	1,430.8	2,011.6	2,595.4	3,195.4
Project assets	131.9	140.1	296.5	320.1	384.4	309.7	282.8	282.8	282.8	282.8	282.8	282.8	282.8	282.8	282.8	282.8	131.4	320.1	282.8	282.8	282.8
Deferred tax assets, net	150.0	157.8	257.7	259.2	265.6	268.2	278.8	278.8	278.8	278.8	278.8	278.8	278.8	278.8	278.8	278.8	130.5	259.2	278.8	278.8	278.8
Marketable securities	305.8	164.0	163.5	180.3	157.4	51.0	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	329.6	180.3	31.9	31.9	31.9
Restricted cash and investments	77.3	81.1	95.0	86.0	147.7	174.7	203.8	203.8	203.8	203.8	203.8	203.8	203.8	203.8	203.8	203.8	36.5	86.0	203.8	203.8	203.8
Investment in related party	25.0	25.0	25.0	-	-	-	-	-	-	-	-	-	-	-	-	-	25.0	-	-	-	-
Goodwill	286.5	286.5	433.3	433.3	458.8	458.8	458.8	458.8	458.8	458.8	458.8	458.8	458.8	458.8	458.8	458.8	286.5	433.3	458.8	458.8	458.8
Inventories	26.9	30.7	36.4	42.7	30.6	42.7	48.2	91.2	72.6	84.8	93.1	98.1	88.2	96.6	97.6	107.8	21.7	42.7	91.2	98.1	107.8
Other assets	35.2	35.4	34.9	43.5	45.7	69.9	148.4	148.4	148.4	148.4	148.4	148.4	148.4	148.4	148.4	148.4	48.2	43.5	148.4	148.4	148.4
Total Assets	**3,473.5**	**3,631.3**	**4,201.8**	**4,380.4**	**4,434.0**	**4,939.2**	**5,723.3**	**6,201.9**	**6,256.1**	**6,469.3**	**6,698.7**	**6,939.6**	**7,037.0**	**7,253.9**	**7,464.0**	**7,715.2**	**3,349.5**	**4,380.4**	**6,201.9**	**6,939.6**	**7,715.2**
LIABILITIES																					
Current Liabilities																					
Accounts Payable	76.0	68.3	71.1	82.3	99.4	189.9	170.9	405.6	322.8	376.8	413.8	436.2	392.2	429.4	434.0	479.2	75.7	82.3	405.6	436.2	479.2
Income taxes payable	15.7	28.6	17.6	16.8	28.1	36.5	33.4	33.4	33.4	33.4	33.4	33.4	33.4	33.4	33.4	33.4	8.7	16.8	33.4	33.4	33.4
Accrued Expenses	141.5	183.9	282.8	244.3	229.0	242.3	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	186.7	244.3	272.0	272.0	272.0
Short-term debt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Current portion of long-term debt	26.4	24.5	26.6	26.6	28.2	28.3	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6	28.6	26.6	25.6	25.6	25.6
Other current liabilities	62.9	20.0	59.6	99.7	85.2	94.9	245.1	245.1	245.1	245.1	245.1	245.1	245.1	245.1	245.1	245.1	95.2	99.7	245.1	245.1	245.1
Total Current Liabilities	322.5	325.2	457.8	469.7	469.9	591.9	747.0	981.7	898.9	952.9	989.9	1,012.3	968.3	1,005.5	1,010.1	1,055.3	394.9	469.7	981.7	1,012.3	1,055.3
Long-term debt, net of current portion																					
Accrued solar module collection and recycling ability	97.8	101.8	128.7	133.0	155.6	176.6	185.2	185.2	185.2	185.2	185.2	185.2	185.2	185.2	185.2	185.2	92.8	133.0	185.2	185.2	185.2
Long-term debt	136.1	114.2	223.8	210.8	103.5	332.5	582.7	582.7	582.7	582.7	582.7	582.7	582.7	582.7	582.7	582.7	146.4	210.8	582.7	582.7	582.7
Other liabilities	70.2	77.9	90.2	112.0	139.1	156.7	182.6	182.6	182.6	182.6	182.6	182.6	182.6	182.6	182.6	182.6	62.6	112.0	182.6	182.6	182.6
Employee stock options on redeemable shares	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total liabilities	**626.7**	**619.1**	**900.4**	**925.5**	**868.1**	**1,257.7**	**1,697.5**	**1,932.2**	**1,849.4**	**1,903.5**	**1,940.4**	**1,962.9**	**1,918.8**	**1,956.0**	**1,960.6**	**2,005.9**	**696.7**	**925.5**	**1,932.2**	**1,962.9**	**2,005.9**
Total Shareholders' Equity	**2,846.9**	**3,012.2**	**3,301.3**	**3,454.9**	**3,565.8**	**3,681.5**	**4,025.8**	**4,269.7**	**4,406.7**	**4,565.8**	**4,758.2**	**4,976.8**	**5,118.2**	**5,297.9**	**5,503.4**	**5,709.4**	**2,652.8**	**3,454.9**	**4,269.7**	**4,976.8**	**5,709.4**
Total Liabilities, redeemable stock and shareholders'	**3,473.5**	**3,631.3**	**4,201.8**	**4,380.4**	**4,434.0**	**4,939.2**	**5,723.3**	**6,201.9**	**6,256.1**	**6,469.3**	**6,698.7**	**6,939.6**	**7,037.0**	**7,253.9**	**7,464.0**	**7,715.2**	**3,349.5**	**4,380.4**	**6,201.9**	**6,939.6**	**7,715.2**
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Days In																					
Accounts Receivables, net	43.3	39.8	36.2	45.7	58.3	92.8	92.8	46.0	48.0	50.0	50.0	45.0	45.0	48.0	48.0	40.0	40.1	43.5	65.8	51.3	43.9
Accounts Receivables, unbilled	4.2	16.4	17.0	0.2	1.7	10.9	10.9	5.0	1.0	2.0	2.0	2.0	-	-	-	-					
ST Inventories	54.9	58.4	35.3	58.4	80.4	87.2	87.2	52.0	65.0	70.0	70.0	65.0	65.0	65.0	65.0	65.0	54.6	53.1	75.3	73.2	71.8
ST Inventory Turns	7.0	6.6	10.1	6.5	5.2	4.6	6.6	6.8	5.6	5.8	5.5	5.6	5.3	5.9	5.6	5.9	7.4	7.8	6.5	5.7	5.3
LT Inventories	8.6	9.2	7.0	12.5	9.1	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5					
LT Inventory Turns	47.0	42.2	56.8	31.7	33.6	36.9	55.2	41.4	28.1	34.1	33.1	32.5	30.0	33.1	31.8	33.2					
Prepaid Expenses	64.0	73.3	25.4	41.7	52.7	70.3	70.3	70.3	70.3	70.3	70.3	70.3	70.3	70.3	70.3	70.3	58.6	37.9	101.9	79.2	77.7
Accounts Payable	8.4	7.4	5.1	24.0	29.5	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	27.1	21.8	74.2	57.7	56.6
Liquidity Ratios																					
Current Ratio	4.4	5.0	3.5	3.4	3.0	3.1	3.3	2.7	3.0	2.9	2.8	2.8	2.9	2.9	2.9	2.8	3.4	3.4	2.7	2.8	2.8
Net Working Capital	661.2	780.2	535.8	349.1	568.6	886.9	1,004.9	799.1	591.5	827.4	960.2	935.9	747.6	902.5	934.4	948.7	291.8	349.1	799.1	935.9	948.7
Long Term Debt / Equity	4.8%	3.8%	6.8%	6.1%	2.9%	9.0%	14.5%	13.6%	13.2%	12.8%	12.2%	11.7%	11.4%	11.0%	10.6%	10.2%	5.5%	6.1%	13.6%	11.7%	10.2%
Total Debt / Equity	4.4%	4.2%	4.7%	4.6%	5.2%	5.6%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6%	4.6%	4.9%	4.2%	3.7%
Total Debt / Total Capital	5.4%	4.4%	7.0%	6.4%	3.6%	8.9%	13.1%	12.5%	12.1%	11.8%	11.3%	10.9%	10.6%	10.3%	10.0%	9.6%	6.2%	6.4%	12.5%	10.9%	9.6%
Book Value Per Share	33.1	34.9	38.1	39.8	41.0	42.3	46.2	48.0	49.5	51.3	53.5	55.9	57.5	59.5	61.8	64.2	31.2	39.9	48.8	55.9	64.2
Cash Per Share	8.3	9.2	9.6	10.8	6.4	5.3	8.8	11.2	14.0	11.6	10.3	11.0	13.3	11.9	12.0	12.2	9.2	10.8	11.4	11.0	12.2
Net Cash Per Share	6.4	7.6	6.7	8.0	4.9	1.2	1.8	4.4	7.2	4.7	3.5	4.2	6.5	5.0	5.2	5.4	7.2	8.0	4.5	4.2	5.4
Cash Per Share (incl LT Investments)	11.8	11.1	11.5	12.8	8.2	5.9	9.1	11.6	14.4	11.9	10.7	11.3	13.7	12.2	12.4	12.6	13.1	12.9	11.8	11.3	12.6
Net Cash Per Share (incl LT Investments)	6.41	7.61	6.7	8.0	4.9	1.19	1.77	4.38	7.19	4.75	3.47	4.15	6.49	5.05	5.16	5.39	7.2	8.0	4.5	4.2	5.4

Source: Company reports, Barclays Capital estimates

Figure 174: GTAT– Historical and Projected Income Statement

	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Mar-14	Mar-10	Mar-11	Mar-12	Mar-13	Mar-14
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3QE	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FYE	FYE	FYE
INCOME STATEMENT																					
Total Revenues	**135.2**	**229.3**	**262.9**	**271.6**	**231.1**	**217.7**	**134.3**	**412.8**	**263.7**	**261.6**	**264.6**	**283.1**	**264.2**	**269.7**	**277.5**	**286.4**	**544.2**	**899.0**	**996.0**	**1,073.1**	**1,097.8**
% Growth - QoQ	-31%	70%	15%	3%	-15%	-6%	-38%	207%	-36%	-1%	1%	7%	-7%	2%	3%	3%					
% Growth - YoY	88%	120%	51%	40%	71%	-5%	-49%	52%	14%	20%	97%	-31%	0%	3%	5%	1%	1%	65%	11%	8%	2%
Cost of Revenue:	89.2	136.2	140.8	154.8	117.7	122.6	84.6	231.2	150.3	147.8	148.2	158.6	153.2	153.7	158.2	160.4	325.3	521.0	556.1	604.9	625.5
Gross Profit (loss)	45.9	93.1	122.1	116.9	113.4	95.1	49.7	181.7	113.4	113.8	116.4	124.6	111.0	116.0	119.3	126.0	219.0	378.0	439.8	468.2	472.3
Operating expenses																					
Research and Development	3.7	5.3	6.7	8.0	11.3	10.0	11.0	12.1	11.5	11.8	12.2	12.3	12.1	12.3	12.6	13.2	21.4	23.8	44.4	47.9	50.2
Selling and Marketing	3.7	5.3	4.5	6.3	6.2	7.1	7.3	7.4	7.5	7.4	7.5	7.3	7.5	7.4	7.5	7.7	11.8	19.8	27.9	29.7	30.0
General and Administrative	10.6	13.0	14.2	18.9	16.2	22.4	19.0	16.2	17.5	18.3	19.1	19.3	18.3	19.0	19.4	20.4	38.6	56.6	73.8	74.1	77.1
Amortization of intangible assets	0.8	0.9	1.9	1.0	1.1	1.8	1.8	1.9	2.0	2.1	2.2	2.4	2.5	2.6	2.7	2.9	3.2	4.5	6.6	8.8	10.7
Total Operating Expenses	18.8	24.5	27.2	34.1	34.7	41.3	39.1	37.6	38.5	39.7	41.0	41.3	40.3	41.3	42.2	44.1	75.0	104.7	152.7	160.5	167.9
Operating Income / (Loss)	**27.1**	**68.6**	**94.8**	**82.7**	**78.7**	**53.8**	**10.6**	**144.0**	**74.9**	**74.1**	**75.5**	**83.3**	**70.6**	**74.6**	**77.2**	**81.9**	**144.0**	**273.3**	**287.1**	**307.7**	**304.3**
EBITDA	**28.8**	**70.7**	**98.2**	**85.3**	**81.4**	**58.0**	**13.1**	**151.9**	**79.8**	**79.03**	**80.5**	**88.7**	**75.6**	**79.7**	**82.4**	**87.3**	**150.8**	**283.0**	**304.3**	**328.0**	**325.1**
Interest Income, or Net	0.2	0.2	0.1	0.1	0.1	0.1	0.6	0.7	0.5	0.7	0.8	0.9	0.9	1.0	1.0	1.0	0.4	0.6	1.5	2.9	3.9
Interest Expense	(0.2)	(0.4)	(0.4)	(1.9)	(3.5)	(1.8)	(1.0)	(0.9)	(0.9)	(0.8)	(0.7)	(0.7)	(0.5)	(0.3)	(0.2)	(0.0)	(0.8)	(2.9)	(7.2)	(3.1)	(1.0)
Interest component of forward FX contracts	0.0	(0.0)	0.0	(0.0)	-	-	-	-	-	-	-	-	-	-	-	-	(0.6)	(0.0)	-	-	-
Other Expense, Net	0.2	(0.9)	0.6	(0.3)	(0.1)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	(3.1)	(0.4)	0.4	0.6	0.6
Total Non Operating Income/ (Loss)	0.2	(1.1)	0.3	(2.1)	(3.5)	(1.6)	(0.2)	(0.0)	(0.2)	0.1	0.2	0.3	0.5	0.8	1.0	1.2	(4.1)	(2.7)	(5.3)	0.4	3.4
Pretax Income / (Loss)	27.3	67.5	95.2	80.6	75.2	52.3	10.4	144.0	74.7	74.2	75.7	83.6	71.2	75.4	78.1	83.1	139.9	270.6	281.8	308.1	307.8
Provision for income taxes	10.8	24.7	31.6	28.7	23.1	15.4	3.1	43.2	22.4	22.2	22.7	25.1	21.4	22.6	23.4	24.9	52.6	95.8	84.8	92.4	92.3
Net income / (loss)	**16.5**	**42.8**	**63.6**	**51.9**	**52.1**	**36.9**	**7.3**	**100.8**	**52.3**	**51.9**	**53.0**	**58.5**	**49.8**	**52.8**	**54.7**	**58.2**	**87.3**	**174.8**	**197.0**	**215.7**	**215.4**
EPS - Basic	0.11	0.29	0.47	0.41	0.41	0.29	0.06	0.79	0.41	0.41	0.41	0.46	0.39	0.41	0.42	0.45	0.61	1.26	1.55	1.69	1.67
EPS - Diluted	**0.11**	**0.28**	**0.46**	**0.41**	**0.41**	**0.29**	**0.06**	**0.78**	**0.40**	**0.40**	**0.41**	**0.45**	**0.38**	**0.40**	**0.42**	**0.44**	**0.60**	**1.24**	**1.53**	**1.66**	**1.65**
Weighted average number of common shares outstanding - basic	144.0	148.8	136.6	125.3	125.9	126.7	127.3	127.5	127.7	127.9	128.1	128.3	128.5	128.7	128.9	129.1	143.4	138.7	126.9	128.0	128.8
Dilutive common stock options and awards																					
Weighted average number of common shares outstanding - diluted	145.6	150.8	138.7	127.9	128.6	129.1	129.3	129.5	129.7	129.9	130.1	130.3	130.5	130.7	130.9	131.1	145.3	140.8	129.1	130.0	130.8
Outstanding common stock options w/o dilutive effect	-																				
Margin Analysis																					
Gross Margin	34.0%	40.6%	46.4%	43.0%	49.1%	43.7%	37.0%	44.0%	43.0%	43.5%	44.0%	44.0%	42.0%	43.0%	43.0%	44.0%	40.2%	42.0%	44.2%	43.6%	43.0%
Selling and Marketing	2.7%	2.3%	1.7%	2.3%	2.7%	3.3%	5.4%	1.8%	2.9%	2.8%	2.8%	2.6%	2.8%	2.7%	2.7%	2.7%	2.2%	2.2%	2.8%	2.8%	2.7%
General and Administrative	7.8%	5.7%	5.4%	7.0%	7.0%	10.3%	14.2%	3.9%	6.6%	7.0%	7.2%	6.8%	6.9%	7.1%	7.0%	7.1%	7.1%	6.3%	7.4%	6.9%	7.0%
R&D	2.8%	2.3%	2.6%	2.9%	4.9%	4.6%	8.2%	2.9%	4.4%	4.5%	4.6%	4.4%	4.6%	4.6%	4.5%	4.6%	3.9%	2.6%	4.5%	4.5%	4.6%
Operating Expenses	13.9%	10.7%	10.4%	12.6%	15.0%	18.9%	29.1%	9.1%	14.6%	15.2%	15.5%	14.6%	15.3%	15.3%	15.2%	15.4%	13.8%	11.6%	15.3%	15.0%	15.3%
Operating Margin	20.0%	29.9%	36.1%	30.5%	34.0%	24.7%	7.9%	34.9%	28.4%	28.3%	28.5%	29.4%	26.7%	27.7%	27.8%	28.6%	26.5%	30.4%	28.8%	28.7%	27.7%
Pretax income	20.2%	29.4%	36.2%	29.7%	32.5%	24.0%	7.7%	34.9%	28.3%	28.4%	28.6%	29.5%	26.9%	28.0%	28.2%	29.0%	25.7%	30.1%	28.3%	28.7%	28.0%
EBITDA Margin	21.3%	30.8%	37.4%	31.4%	35.2%	26.6%	9.8%	36.8%	30.3%	30.2%	30.4%	31.3%	28.6%	29.6%	29.7%	30.5%	27.7%	31.5%	30.6%	30.6%	29.6%
Tax Rate	39.6%	36.6%	33.2%	35.6%	30.7%	29.4%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	37.6%	35.4%	30.1%	30.0%	30.0%
Net Margin	12.2%	18.7%	24.2%	19.1%	22.5%	17.0%	5.4%	24.4%	19.8%	19.8%	20.0%	20.7%	18.9%	19.6%	19.7%	20.3%	16.0%	19.4%	19.8%	20.1%	19.6%
% QoQ																					
Research and Development	-25.9%	41.2%	27.4%	18.4%	41.3%	-11.2%	10.0%	10.0%	-5.0%	3.0%	3.0%	1.0%	-2.0%	2.0%	2.0%	5.0%	16.8%	10.9%	86.9%	7.9%	4.8%
Selling and Marketing	54.6%	43.6%	-15.9%	40.1%	-1.9%	15.6%	2.0%	2.0%	2.0%	-2.0%	1.0%	-2.0%	2.0%	-1.0%	1.0%	3.0%	-32.3%	67.4%	41.1%	6.5%	0.9%
General and Administrative	11.6%	22.8%	8.9%	33.5%	-14.3%	38.0%	-15.0%	-15.0%	8.0%	5.0%	4.0%	1.0%	-5.0%	4.0%	2.0%	5.0%	19.8%	46.7%	30.2%	0.5%	4.0%
Amortization of intangible assets	0.0%	9.5%	115.4%	-47.6%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	1.9%	42.2%	47.1%	32.7%	21.6%
Total Operating Expenses	6.2%	30.0%	11.3%	25.3%	1.7%	18.9%	-5.1%	-3.9%	2.5%	3.0%	3.2%	0.7%	-2.3%	2.5%	2.0%	4.6%	5.5%	39.6%	45.8%	5.1%	4.6%

Source: Company reports, Barclays Capital estimates

Figure 175: GTAT– Historical and Projected Revenues by Segment

($ millions except per share data)	Jun-10 1Q	Sep-10 2Q	Dec-10 3Q	Mar-11 4Q	Jun-11 1Q	Sep-11 2Q	Dec-11 3QE	Mar-12 4QE	Jun-12 1QE	Sep-12 2QE	Dec-12 3QE	Mar-13 4QE	Jun-13 1QE	Sep-13 2QE	Dec-13 3QE	Mar-14 4QE	Mar-10 FY	Mar-11 FY	Mar-12 FYE	Mar-13 FYE	Mar-14 FYE
PERFORMANCE BY SEGMENT																					
Revenues																					
Photovoltaic Business	111.4	202.8	239.9	186.0	198.6	98.0	58.8	59.4	61.8	58.7	59.3	71.1	67.6	68.2	69.6	70.3	186.7	740.1	414.8	250.82	275.69
Polysilicon Business	23.7	23.3	17.3	79.2	23.9	111.2	50.0	56.0	53.2	52.7	52.2	52.7	53.2	53.8	54.3	54.8	357.5	143.6	241.2	210.84	216.14
Sapphire Business	-	3.2	5.7	6.4	8.6	8.5	25.5	297.4	148.7	150.2	153.2	159.3	143.4	147.7	153.6	161.3	-	15.3	340.0	611.43	605.98
Corporate Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Revenues	135.2	229.3	262.9	271.6	231.1	217.7	134.3	412.8	263.7	261.6	264.6	283.1	264.2	269.7	277.5	286.4	544.2	899.0	996.0	1,073.1	1,097.8
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
% of Sales																					
Photovoltaic Business	82.4%	88.4%	91.2%	68.5%	86.0%	45.0%	43.8%	14.4%	23.4%	22.4%	22.4%	25.1%	25.6%	25.3%	25.1%	24.5%	34.3%	82.3%	41.6%	23.4%	25.1%
Polysilicon Business	17.6%	10.2%	6.6%	29.2%	10.3%	51.1%	37.2%	13.6%	20.2%	20.2%	19.7%	18.6%	20.1%	19.9%	19.6%	19.1%	65.7%	16.0%	24.2%	19.6%	19.7%
Sapphire Business	0.0%	1.4%	2.2%	2.3%	3.7%	3.9%	19.0%	72.0%	56.4%	57.4%	57.9%	56.3%	54.3%	54.8%	55.4%	56.3%	0.0%	1.7%	34.1%	57.0%	55.2%
Corporate Services	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Revenues	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% QoQ																					
Photovoltaic Business	73.9%	82.0%	18.3%	-22.4%	6.8%	-50.7%	-40.0%	1.0%	4.0%	-5.0%	1.0%	20.0%	-5.0%	1.0%	2.0%	1.0%					
Polysilicon Business	-81.8%	-1.9%	-25.6%	357.2%	-69.9%	365.6%	-55.0%	12.0%	-5.0%	-1.0%	-1.0%	1.0%	1.0%	1.0%	1.0%	1.0%					
Sapphire Business			76.6%	11.4%	34.9%	-1.0%	200.0%	1066.3%	-50.0%	1.0%	2.0%	4.0%	-10.0%	3.0%	4.0%	5.0%					
Corporate Services					0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%					
Total Revenues	-30.6%	69.6%	14.7%	3.3%	-14.9%	-5.8%	-38.3%	207.3%	-36.1%	-0.8%	1.2%	7.0%	-6.7%	2.1%	2.9%	3.2%					
% YoY																					
Photovoltaic Business	459.0%	224.9%	495.2%	190.2%	78.2%	-51.7%	-75.5%	-68.1%	-68.9%	-40.1%	0.8%	39.5%	18.8%	32.6%	34.9%	-2.3%	-57.9%	296.3%	-44.0%	-39.5%	9.9%
Polysilicon Business	-54.3%	-44.3%	-87.0%	-39.3%	0.7%	377.6%	188.7%	-29.3%	122.9%	-52.6%	4.3%	-11.9%	0.0%	4.0%	8.1%	8.1%	268.3%	-59.8%	68.0%	-12.6%	2.5%
Sapphire Business						162.8%	346.6%	4575.6%	1632.6%	1667.0%	500.8%	-92.9%	-7.1%	-3.3%	0.5%	2.5%			2121.5%	79.8%	-0.9%
Corporate Services																					
Total Revenues	88.2%	120.1%	51.5%	39.5%	71.0%	-5.1%	-48.9%	52.0%	14.1%	20.2%	97.0%	-62.8%	0.4%	6.2%	9.7%	2.3%	0.6%	65.2%	10.8%	7.7%	2.3%

Source: Company reports, Barclays Capital estimates

Figure 176: GTAT– Historical and Projected Balance Sheet

	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Mar-14	Mar-10	Mar-11	Mar-12	Mar-13	Mar-14
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3QE	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FYE	FYE	FYE
BALANCE SHEET																					
ASSETS																					
Current Assets																					
Cash and Cash Equivalents	256.5	244.6	320.4	362.7	473.4	483.8	565.4	420.6	591.4	638.9	682.9	717.6	760.0	791.9	821.0	855.3	230.7	362.7	420.6	717.6	855.3
Restricted Cash	-	34.5	-	-	-	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	-	-	10.2	10.2	10.2
Short-Term Investments	20.0	15.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.0	-	-	-	-
Accounts Receivables, net	37.3	71.7	100.1	87.1	55.4	68.1	42.0	129.2	82.5	81.8	82.8	88.6	82.6	84.4	86.8	89.6	52.6	87.1	129.2	88.6	89.6
Inventories	80.7	113.8	120.4	127.6	162.0	156.5	108.0	295.1	191.9	188.6	189.2	202.4	195.6	196.2	201.9	204.7	68.9	127.6	295.1	202.4	204.7
Advances on inventory purchases	127.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.1	-	-	-	-
Deferred Costs	28.8	102.1	119.3	125.8	107.6	159.8	159.8	159.8	159.8	159.8	159.8	159.8	159.8	159.8	159.8	159.8	132.0	125.8	159.8	159.8	159.8
Vendor Advances	-	37.3	18.4	20.0	24.8	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	-	20.0	34.9	34.9	34.9
Deferred Income Tax	67.4	59.0	58.6	62.5	64.2	57.7	57.7	57.7	57.7	57.7	57.7	57.7	57.7	57.7	57.7	57.7	72.9	62.5	57.7	57.7	57.7
Refundable Income Taxes	1.5	1.5	1.5	21.8	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	21.8	1.5	1.5	1.5
Prepaid Expenses and other current assets	1.7	3.4	2.7	17.1	13.3	15.8	10.9	29.7	19.3	19.0	19.1	20.4	19.7	19.8	20.3	20.6	4.3	17.1	29.7	20.4	20.6
Total Current Assets	**621.3**	**683.0**	**741.4**	**824.7**	**902.3**	**988.2**	**990.4**	**1,138.6**	**1,149.2**	**1,192.5**	**1,238.0**	**1,293.1**	**1,322.0**	**1,356.3**	**1,394.1**	**1,434.4**	**600.0**	**824.7**	**1,138.6**	**1,293.1**	**1,434.4**
Property, plant and equipment, net	19.7	29.8	40.0	54.4	62.1	75.0	78.2	87.8	90.7	93.6	96.5	99.7	102.6	105.6	108.6	111.8	19.4	54.4	87.8	99.7	111.8
Other assets	0.7	0.4	10.3	9.9	7.8	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	0.6	9.9	18.6	18.6	18.6
Intangible Assets	2.4	19.6	23.7	22.7	21.6	91.7	91.7	91.7	91.7	91.7	91.7	91.7	91.7	91.7	91.7	91.7	3.2	22.7	91.7	91.7	91.7
Deferred Costs	55.9	62.7	100.8	129.3	120.9	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	66.3	129.3	87.3	87.3	87.3
Advanced on Inventory Purchases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Goodwill	42.6	89.5	85.2	85.2	84.8	116.1	116.1	116.1	116.1	116.1	116.1	116.1	116.1	116.1	116.1	116.1	42.6	85.2	116.1	116.1	116.1
Total Assets	**742.5**	**885.1**	**1,001.3**	**1,126.3**	**1,199.4**	**1,377.0**	**1,382.3**	**1,540.2**	**1,553.7**	**1,599.8**	**1,648.3**	**1,706.5**	**1,738.4**	**1,775.7**	**1,816.5**	**1,859.9**	**732.1**	**1,126.3**	**1,540.2**	**1,706.5**	**1,859.9**
LIABILITIES																					
Current Liabilities																					
Current Portion of Long Term Debt	-	-	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	-	18.8	18.8	18.8	18.8
Accounts Payable	31.1	42.1	76.4	63.4	40.2	51.7	35.7	97.5	63.4	62.3	62.5	66.9	64.6	64.8	66.7	67.6	22.1	63.4	97.5	66.9	67.6
Accrued Expenses	19.8	24.1	28.9	40.0	28.6	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	17.5	40.0	35.4	35.4	35.4
Contingent Consideration		8.5	8.3	4.8	6.6	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	-	4.8	17.2	17.2	17.2
Customer Deposits	139.1	194.8	166.3	144.4	263.6	300.8	300.8	300.8	300.8	300.8	300.8	300.8	300.8	300.8	300.8	300.8	119.6	144.4	300.8	300.8	300.8
Deferred Revenue	234.7	192.7	227.0	247.5	191.1	292.9	292.9	292.9	292.9	292.9	292.9	292.9	292.9	292.9	292.9	292.9	230.0	247.5	292.9	292.9	292.9
Accured Income Taxes	10.4	5.2	22.0	23.0	32.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	33.6	23.0	16.1	16.1	16.1
Total Current Liabilities	**435.0**	**467.4**	**547.6**	**541.9**	**581.0**	**732.9**	**716.9**	**778.7**	**744.6**	**743.5**	**743.7**	**748.0**	**745.8**	**746.0**	**747.9**	**748.8**	**422.9**	**541.9**	**778.7**	**748.0**	**748.8**
Long-term debt, net of current portion																					
Long-Term Debt	-	-	106.3	101.6	76.9	72.2	86.3	81.6	76.9	72.2	67.5	62.8	47.1	31.4	15.7	0.0	-	101.6	81.6	62.8	0.0
Deferred Income Taxes	23.7	29.7	29.2	59.1	49.3	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	25.7	59.1	59.4	59.4	59.4
Deferred Revenue	86.6	104.1	161.2	198.0	204.6	167.9	167.9	167.9	167.9	167.9	167.9	167.9	167.9	167.9	167.9	167.9	104.4	198.0	167.9	167.9	167.9
Contingent Consideration Long-Term Portion	-	5.5	5.2	6.4	5.3	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	-	6.4	6.1	6.1	6.1
Other Non-Current Liabilities	0.1	0.2	0.4	0.8	0.3	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	0.2	0.8	12.7	12.7	12.7
Accrued Income Taxes	-	-	10.3	16.6	19.7	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	-	16.6	20.4	20.4	20.4
Total liabilities	**545.5**	**606.8**	**860.0**	**924.4**	**936.9**	**1,071.6**	**1,069.6**	**1,126.8**	**1,088.0**	**1,082.2**	**1,077.7**	**1,077.4**	**1,059.4**	**1,043.9**	**1,030.1**	**1,015.3**	**553.1**	**924.4**	**1,126.8**	**1,077.4**	**1,015.3**
SHAREHOLDERS' EQUITY																					
Common stock	1.4	1.5	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.3	1.3	1.3	1.3
Additional paid-in capital	89.5	126.4	116.6	123.3	130.9	137.5	137.5	137.5	137.5	137.5	137.5	137.5	137.5	137.5	137.5	137.5	86.6	123.3	137.5	137.5	137.5
Accumulated other comprehensive income (loss)	(6.4)	(5.0)	(4.9)	(2.9)	(2.0)	(2.6)	(2.6)	(2.6)	(2.6)	(2.6)	(2.6)	(2.6)	(2.6)	(2.6)	(2.6)	(2.6)	(5.1)	(2.9)	(2.6)	(2.6)	(2.6)
Retained Earnings	112.5	155.3	28.3	80.2	132.3	169.2	176.4	277.2	329.5	381.4	434.4	492.9	542.7	595.5	650.2	708.4	96.0	80.2	277.2	492.9	708.4
Total Shareholders' Equity	**197.1**	**278.3**	**141.3**	**201.9**	**262.5**	**305.4**	**312.6**	**413.4**	**465.7**	**517.6**	**570.6**	**629.1**	**679.0**	**731.7**	**786.4**	**844.6**	**179.0**	**201.9**	**413.4**	**629.1**	**844.6**
Total Liabilities, redeemable stock and shareholders' equity	**742.5**	**885.1**	**1,001.3**	**1,126.3**	**1,199.4**	**1,377.0**	**1,382.3**	**1,540.2**	**1,553.7**	**1,599.8**	**1,648.3**	**1,706.5**	**1,738.4**	**1,775.7**	**1,816.5**	**1,859.9**	**732.1**	**1,126.3**	**1,540.2**	**1,706.5**	**1,859.9**
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Days In																					
Accounts Receivables, net	25.2	28.6	34.8	29.3	21.9	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	35.3	35.4	47.3	30.1	29.8
Inventories	82.5	76.3	78.0	75.2	125.6	116.5	116.5	116.5	116.5	116.5	116.5	116.5	116.5	116.5	116.5	116.5	77.3	89.4	193.7	122.1	119.5
Inventory Turns	4.8	5.6	4.8	5.0	3.3	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.8	5.3	2.6	2.4	3.1
Prepaid Expenses	1.8	2.3	1.7	10.1	10.3	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	4.9	12.0	19.5	12.3	12.0
Accounts Payable	31.8	28.2	49.5	37.4	31.2	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	24.8	44.4	64.0	40.3	39.5
Deferred Revenues	240.0	129.1	147.1	145.9	148.2	218.0	218.0	218.0	218.0	218.0	218.0	218.0	218.0	218.0	218.0	218.0	258.0	173.4	192.3	176.8	170.9
Valuation Ratios																					
Return on Equity	33.5%	61.5%	180.0%	102.8%	79.3%	48.4%	9.3%	97.5%	44.9%	40.1%	37.1%	37.2%	29.3%	28.8%	27.8%	27.5%	48.8%	86.5%	47.7%	34.3%	25.5%
Return on Average Equity (LTM)	48.7%	46.5%	110.5%	86.5%	80.1%	67.0%	47.4%	47.7%	42.4%	41.0%	45.2%	34.3%	31.4%	29.3%	27.4%	25.5%					
Return on Assets	8.9%	19.3%	25.4%	18.4%	17.4%	10.7%	2.1%	26.2%	13.5%	13.0%	12.9%	13.7%	11.5%	11.9%	12.0%	12.5%	11.9%	15.5%	12.8%	12.6%	11.6%
Return on Net Assets	33.5%	61.5%	180.0%	102.8%	79.3%	48.4%	9.3%	97.5%	44.9%	40.1%	37.1%	37.2%	29.3%	28.8%	27.8%	27.5%	48.8%	86.5%	47.7%	34.3%	25.5%
Return on Sales	12.2%	18.7%	24.2%	19.1%	22.5%	17.0%	5.4%	24.4%	19.8%	19.8%	20.0%	20.7%	18.9%	19.6%	19.7%	20.3%	16.0%	19.4%	19.8%	20.1%	19.6%
Liquidity Ratios																					
Current Ratio	1.4	1.5	1.4	1.5	1.6	1.3	1.4	1.5	1.5	1.6	1.7	1.7	1.8	1.8	1.9	1.9	1.4	1.5	1.5	1.7	1.9
Net Working Capital	(70.2)	(29.0)	(126.6)	(79.9)	(152.0)	(228.4)	(291.8)	(60.6)	(186.8)	(189.9)	(188.6)	(172.6)	(183.8)	(181.6)	(174.7)	(169.8)	(53.6)	(79.9)	(60.6)	(172.6)	(169.8)
Long Term Debt / Equity	0.0%	0.0%	75.2%	50.3%	29.3%	23.6%	27.6%	19.7%	16.5%	13.9%	11.8%	10.0%	6.9%	4.3%	2.0%	0.0%	0.0%	50.3%	19.7%	10.0%	0.0%
Total Debt / Equity	0.0%	0.0%	88.5%	59.6%	36.4%	29.8%	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0%	59.6%	0.2	0.1	0.0
Total Debt / Total Capital	0.0%	0.0%	42.9%	33.5%	22.7%	19.1%	21.6%	16.5%	14.2%	12.2%	10.6%	9.1%	6.5%	4.1%	2.0%	0.0%	0.0%	33.5%	16.5%	9.1%	0.0%
Book Value Per Share	1.4	1.9	1.0	1.6	2.0	2.4	2.4	3.2	3.6	4.0	4.4	4.8	5.2	5.6	6.0	6.4	1.2	1.4	3.2	4.8	6.5
Cash Per Share	1.9	2.0	2.3	2.8	3.7	3.8	4.5	3.3	4.6	5.0	5.3	5.6	5.9	6.1	6.4	6.6	1.7	2.6	3.3	5.6	6.6
Net Cash Per Share	1.90	1.95	1.54	2.04	3.08	3.27	3.79	2.70	4.05	4.44	4.81	5.10	5.54	5.90	6.23	6.60	1.7	1.9	2.7	5.1	6.6

Source: Company reports, Barclays Capital estimates

Figure 177: GTAT– Historical and Projected Statement of Cash Flows

	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Mar-14	Mar-10	Mar-11	Mar-12	Mar-13	Mar-14
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3QE	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FYE	FYE	FYE
CASH FLOW STATEMENT																					
Operating Activities																					
Net Income	16.5	42.8	63.6	51.9	52.1	36.9	7.3	100.8	52.3	51.9	53.0	58.5	49.8	52.8	54.7	58.2	87.3	174.8	197.0	215.7	215.4
Amortization Expense	0.8	0.9	1.9	1.0	1.1	1.8	1.1	3.3	2.1	2.1	2.1	2.3	2.1	2.2	2.2	2.3	3.2	4.5	7.3	8.7	8.9
Depreciation Expense	0.9	1.1	1.5	1.6	1.6	2.4	1.5	4.5	2.9	2.8	2.9	3.1	2.9	2.9	3.0	3.1	3.7	5.2	9.9	11.7	11.9
Contingent Consideration Expense	-	0.3	0.7	0.8	0.7	1.9											-	1.8	2.6	-	-
Deferred Income Tax (Benefit)	4.4	5.3	(2.2)	26.0	(9.7)	0.6	-	-	-	-	-	-	-	-	-	-	(39.2)	33.5	(9.1)	-	-
Provision for Excess and Obsolete Inventory	1.2	0.6	0.3	(0.0)	1.3	5.9											6.9	2.1	7.1	-	-
Share-based Compensation Expense	1.5	2.4	1.8	2.6	3.1	3.8											5.7	8.2	6.9	-	-
Excess Tax Benefit from Share-Based Award Activity	-	-	-	-	(2.2)	(1.0)											-	-	(3.2)	-	-
Amortization of Deferred Financing Costs	-	-	-	-	2.2	0.8													3.1	-	-
Other Adjustments, net	0.2	0.2	0.3	0.6	0.3	0.3											0.8	1.3	0.5	-	-
Changes in Operating Assets and Liabilities																					
Restricted Cash	-	(34.5)	34.5	-	-	(10.2)	-	-	-	-	-	-	-	-	-	-	-	-	(10.2)	-	-
Accounts Receivable	15.2	(32.9)	(28.4)	13.2	31.7	(13.2)	26.1	(87.1)	46.7	0.7	(1.0)	(5.8)	5.9	(1.7)	(2.4)	(2.8)	4.8	(33.0)	(42.5)	40.6	(1.0)
Inventories	(13.0)	(30.9)	(6.7)	(7.1)	(35.6)	0.1	48.5	(187.1)	103.2	3.2	(0.5)	(13.2)	6.8	(0.6)	(5.7)	(2.8)	27.7	(57.8)	(174.1)	92.7	(2.3)
Deferred Costs	14.9	18.6	(55.2)	(35.1)	26.6	(18.6)	-	-	-	-	-	-	-	-	-	-	13.4	(56.9)	8.0	-	-
Vendor Advances	-	(19.7)	18.9	(1.6)	(4.8)	(12.2)	-	-	-	-	-	-	-	-	-	-	-	(2.5)	(16.9)	-	-
Advances on Inventory Purchases	(11.6)	11.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	103.1	-	-	-	-
Prepaid Expenses and Other Assets	2.5	(1.4)	0.5	(13.9)	4.3	(9.6)	4.9	(18.8)	10.4	0.3	(0.1)	(1.3)	0.7	(0.1)	(0.6)	(0.3)	(2.4)	(12.4)	(19.3)	9.3	(0.2)
A/P, Accrued Expenses, and other Non-Current Liabilities	9.5	15.8	32.3	2.9	(35.3)	10.5	(16.0)	61.8	(34.1)	(1.1)	0.2	4.4	(2.2)	0.2	1.9	0.9	(22.4)	60.5	21.0	(30.6)	0.8
Customer Deposits	19.5	54.7	(28.5)	(21.9)	119.1	35.2	-	-	-	-	-	-	-	-	-	-	(103.0)	23.8	154.3	-	-
Deferred Revenue	(13.0)	(24.5)	91.3	57.4	(49.8)	65.1	-	-	-	-	-	-	-	-	-	-	(13.8)	111.2	15.3	-	-
Income Taxes	-	-	-	-	32.6	(15.3)													17.3	-	-
Accrued Income Taxes	(23.3)	(5.2)	27.1	7.3	-	-	-	-	-	-	-	-	-	-	-	-	37.0	5.9	-	-	-
Refundable and Prepaid Income Taxes	-	-	-	(20.3)	-	-	-	-	-	-	-	-	-	-	-	-	35.3	(20.3)	-	-	-
Other, net	(0.6)	(0.1)	0.7	1.7	0.5	1.4	-	-	-	-	-	-	-	-	-	-	(0.7)	1.7	1.8	-	-
Net Cash Provided by Operating Activities	**25.6**	**4.9**	**154.3**	**66.9**	**139.7**	**86.5**	**73.2**	**(122.6)**	**183.5**	**60.0**	**56.6**	**47.9**	**66.0**	**55.7**	**53.1**	**58.6**	**147.3**	**251.8**	**176.8**	**348.0**	**233.4**
Investing Activities																					
Purchase of Short Term Investments	-	-	-														(20.0)		-	-	-
Proceeds From Sale of Short Term Investments	-	5.0	15.0																-	-	-
Purchases and maturities of short term investments	-	5.0	15.0	-	-		-	-	-	-	-	-	-	-	-	-	(20.0)	20.0	-	-	-
(Purchase)/Sale of Property Plant and Equipment	(1.3)	(2.9)	(6.4)	(20.6)	(8.9)	(9.2)	(5.7)	(17.5)	(7.9)	(7.8)	(7.9)	(8.5)	(7.9)	(8.1)	(8.3)	(8.6)	(4.6)	(31.3)	(41.2)	(32.2)	(32.9)
Acquisition of Crystal System, net of acquired cash	-	(22.8)	-	-	-	(60.9)	-	-	-	-	-	-	-	-	-	-		(22.8)	(60.9)	-	-
Other investing activities	-	-	-	-	-	0.4	-	-	-	-	-	-	-	-	-	-	-	-	0.4	-	-
Net Cash Provided by Investing Activities	**(1.3)**	**(20.7)**	**8.6**	**(20.6)**	**(8.9)**	**(69.7)**	**(5.7)**	**(17.5)**	**(7.9)**	**(7.8)**	**(7.9)**	**(8.5)**	**(7.9)**	**(8.1)**	**(8.3)**	**(8.6)**	**(24.5)**	**(34.0)**	**(101.8)**	**(32.2)**	**(32.9)**
Financing Activities																					
Borrowings Under Credit Facility	-	-	125.0	-	-		-	-	-	-	-	-	-	-	-	-		125.0	-	-	-
Principal Payments under Credit Facility	-	-	-	(4.7)	(24.7)	(4.7)	14.1	(4.7)	(4.7)	(4.7)	(4.7)	(4.7)	(15.7)	(15.7)	(15.7)	(15.7)		(4.7)	(20.0)	(18.8)	(62.8)
Payment of Dividends to Stockholders	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Payment of contingent consideration from business combination	-	-	-	(3.1)	-	(4.5)	-	-	-	-	-	-	-	-	-	-		(3.1)	(4.5)	-	-
Proceeds and Excess Tax Benefit from Exercise of Stock Options	1.3	4.1	1.9	4.4	5.7	3.3											1.6	11.8	9.0	-	-
Payments related to share repurchases to satisfy statutory minimu	(0.1)	(0.4)	(0.8)	(0.3)	(1.1)	(0.5)											(0.7)	(1.5)	(1.7)	-	-
Repurchase of Common Stock	-	-	(203.5)	-	-		-	-	-	-	-	-	-	-	-	-		(203.5)	-	-	-
Deferred Financing Costs	-	-	(9.9)	(0.1)	(0.1)	(0.0)												(9.9)	(0.1)	-	-
Credit Facility Issuance Costs	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Cash Provided by Financing Activities	**1.3**	**3.7**	**(87.3)**	**(3.7)**	**(20.3)**	**(6.4)**	**14.1**	**(4.7)**	(4.7)	**(4.7)**	**(4.7)**	**(4.7)**	**(15.7)**	**(15.7)**	**(15.7)**	**(15.7)**	**0.9**	**(85.9)**	**(17.3)**	**(18.8)**	**(62.8)**
Effect of foreign exchange rates on cash and cash equivalents	0.1	0.2	0.1	(0.2)	0.0	(0.0)											0.0	0.2	0.0	-	-
Net increase in cash and cash equivalents	25.7	(11.8)	75.7	42.4	110.6	10.4	81.6	(144.8)	170.9	47.5	44.0	34.8	42.4	31.9	29.1	34.3	123.6	132.0	57.8	297.1	137.7
Cash and cash equivalents at beginning of period	230.7	256.5	244.6	320.4	362.7	473.4	483.8	565.4	420.6	591.4	638.9	682.9	717.6	760.0	791.9	821.0	107.1	230.7	565.4	682.9	717.6
Cash and cash equivalents at end of period	256.5	244.6	320.4	362.7	473.4	483.8	565.4	420.6	591.4	638.9	682.9	717.6	760.0	791.9	821.0	855.3	230.7	362.7	623.2	980.0	855.3
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			

Source: Company reports, Barclays Capital estimates

Source: Company reports, Barclays Capital estimates

Figure 178: ITRI– Historical and Projected Income Statement

	Mar-10	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-08	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FY	FYE	FYE	FYE
INCOME STATEMENT																						
Total Revenues	**497.6**	**567.3**	**573.7**	**620.7**	**563.7**	**612.4**	**615.6**	**559.1**	**556.4**	**558.1**	**563.2**	**567.6**	**567.7**	**573.8**	**588.9**	**607.2**	**1,909.6**	**1,687.4**	**2,259.3**	**2,350.7**	**2,245.4**	**2,337.6**
% Growth - QoQ	4%	14%	1%	8%	-9%	9%	1%	-9%	0%	0%	1%	1%	0%	1%	3%	3%						
% Growth - YoY	28%	37%	40%	30%	13%	8%	7%	-10%	-1%	-9%	-9%	2%	2%	3%	5%	7%		-12%	34%	4%	-4%	4%
Cost of Revenue:	340.6	393.3	391.9	435.3	379.6	421.3	439.4	389.7	390.6	390.7	391.4	394.5	397.4	398.8	406.3	419.0	1,262.8	1,150.0	1,561.0	1,629.9	1,567.2	1,621.5
Gross Profit (loss)	157.1	174.1	181.8	185.4	184.1	191.1	176.2	169.4	165.8	167.4	171.8	173.1	170.3	175.0	182.6	188.2	646.9	537.5	698.2	720.8	678.2	716.1
Operating expenses																						
Sales and Marketing	41.5	41.0	41.2	48.0	44.6	48.8	45.0	41.9	43.1	42.7	43.1	44.0	44.4	45.3	45.8	47.2	167.5	152.4	171.7	180.4	173.0	182.7
Product Development	33.0	33.0	34.0	40.1	40.4	40.9	38.7	36.0	36.3	36.7	36.3	37.8	38.2	38.5	38.9	39.7	120.7	122.3	140.2	156.0	147.1	155.3
General and Administrative	33.1	33.3	30.7	36.034	33.3	35.1	32.2	30.6	30.0	30.3	30.6	31.8	30.9	31.5	31.8	32.7	128.5	119.1	133.1	131.3	122.7	126.9
Amortization of Intangible Assets	17.8	16.8	16.9	17.6	15.6	16.2	16.0	16.2	12.6	12.6	12.6	12.6	10.4	10.4	10.4	10.4	120.4	98.6	69.1	64.0	50.2	41.4
Restructuring	-	-	-	-	-	1.9	1.1	-	-	-	-	-	-	-	-	-	-	-	-	3.0	-	-
Goodwill Impairment							540.4													540.4		
Total Operating Expenses	125.4	124.0	122.8	141.7	134.0	143.0	673.4	124.6	122.0	122.2	122.6	126.1	123.8	125.7	126.9	130.0	537.0	492.4	514.0	1,075.1	493.0	506.3
Operating Income / (Loss)	**31.6**	**50.0**	**58.9**	**43.6**	**50.1**	**48.1**	**(497.3)**	**44.8**	**43.8**	**45.2**	**49.2**	**47.0**	**46.5**	**49.3**	**55.7**	**58.3**	**109.8**	**45.0**	**184.2**	**(354.3)**	**185.1**	**209.8**
Adjusted EBIT	**49.4**	**66.8**	**75.8**	**61.2**	**65.7**	**66.2**	**60.3**	**60.9**	**56.4**	**57.7**	**61.7**	**59.5**	**56.9**	**59.7**	**66.1**	**68.6**	**230.2**	**143.6**	**253.2**	**253.1**	**235.4**	**251.2**
Adjusted EBITDA	**64.3**	**81.4**	**86.6**	**74.0**	**80.0**	**80.3**	**73.7**	**71.3**	**70.1**	**71.6**	**75.9**	**73.9**	**73.4**	**76.6**	**83.8**	**87.3**	**280.5**	**191.6**	**306.3**	**305.3**	**291.5**	**321.1**
Other Income (Expense), Net	(0.6)	(0.4)	(4.4)	(3.7)	(1.6)	(2.5)	(3.1)	(3.1)	(3.1)	(3.1)	(3.1)	(3.1)	(3.1)	(3.1)	(3.1)	(3.1)	(3.0)	(9.2)	(9.1)	(10.4)	(12.6)	(12.6)
Total Other Operating Income/ (Loss)	(15.3)	(14.3)	(17.6)	(16.2)	(13.4)	(13.7)	(13.8)	(7.9)	(3.8)	(3.8)	(3.7)	(3.7)	(3.6)	(3.6)	(3.6)	(3.6)	(91.2)	(91.1)	(63.5)	(48.9)	(15.0)	(14.4)
Pretax Income / (Loss)	16.3	35.7	41.4	27.4	36.7	34.4	(511.0)	36.8	40.0	41.4	45.4	43.3	42.9	45.7	52.1	54.7	18.6	(46.1)	120.7	(403.2)	170.1	195.4
Adjusted Pretax Income	37.7	56.5	62.2	48.8	56.2	56.1	49.4	55.9	55.5	56.9	60.9	58.7	56.1	59.0	65.4	68.0	161.1	70.2	205.2	217.6	232.0	248.5
Provision for income taxes	9.0	(10.4)	(13.7)	(0.8)	(9.6)	0.1	(6.0)	(10.7)	(12.0)	(12.4)	(13.6)	(13.0)	(13.3)	(14.2)	(16.2)	(17.0)	1.2	43.8	(16.0)	(26.2)	(51.0)	(60.6)
Non GAAP Tax Adjustment	(6.8)	(7.2)	(6.5)	(9.2)	(6.1)	(7.0)	(5.6)	(5.5)	(4.6)	(4.6)	(4.6)	(4.6)	(4.1)	(4.1)	(4.1)	(4.1)	(44.7)	(25.7)	(29.8)	(24.2)	(18.6)	(16.5)
Total Adjusted Tax Expense	2.2	(17.6)	(20.3)	(10.1)	(15.7)	(6.9)	(11.6)	(16.2)	(16.7)	(17.1)	(18.3)	(17.6)	(17.4)	(18.3)	(20.3)	(21.1)	(43.5)	(23.7)	(12.2)	(50.4)	(69.6)	(77.0)
Total Non GAAP Charges	3.7	4.0	4.0	3.8	3.9	3.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	22.1	17.7	15.4	13.3	11.7	11.7
Net income / (loss)	25.25	25.31	27.64	26.57	27.12	34.436	(517.1)	20.6	23.4	24.3	27.2	25.6	25.5	27.4	31.8	33.6	19.8	(2.2)	104.8	(429.4)	100.5	118.3
Adjusted Net income / (loss)	**39.9**	**38.9**	**41.9**	**38.7**	**40.5**	**49.1**	**37.8**	**39.7**	**38.9**	**39.8**	**42.6**	**41.1**	**38.7**	**40.7**	**45.1**	**46.9**	**117.6**	**88.3**	**159.5**	**167.1**	**162.4**	**171.5**
EPS - Basic	0.63	0.63	0.68	0.66	0.67	0.85	(12.70)	0.51	0.58	0.60	0.67	0.63	0.62	0.67	0.78	0.82	0.60	(0.06)	2.60	(10.58)	2.48	2.89
EPS - Diluted	0.62	0.61	0.68	0.65	0.66	0.84	(12.70)	0.51	0.57	0.59	0.66	0.62	0.62	0.66	0.77	0.81	0.57	(0.06)	2.56	(10.49)	2.45	2.85
EPS - Non GAAP Diluted	**0.98**	**0.94**	**1.03**	**0.95**	**0.99**	**1.20**	**0.92**	**0.97**	**0.94**	**0.96**	**1.03**	**0.99**	**0.93**	**0.98**	**1.08**	**1.12**	**3.37**	**2.27**	**3.89**	**4.07**	**3.93**	**4.10**
Shares Outstanding (Basic)	40.2	40.3	40.4	40.4	40.5	40.7	40.7	40.3	40.4	40.5	40.6	40.7	40.8	40.9	41.0	41.1	33.1	38.5	40.3	40.6	40.6	41.0
Shares Outstanding (Diluted)	40.9	41.2	40.8	40.9	41.0	41.1	40.7	40.8	40.9	41.0	41.1	41.2	41.3	41.4	41.5	41.6	34.9	38.7	41.0	40.9	41.1	41.5
Adjusted Shares Outstanding (Diluted)	**40.9**	**41.2**	**40.8**	**40.9**	**41.0**	**41.1**	**41.0**	**41.1**	**41.2**	**41.3**	**41.4**	**41.5**	**41.6**	**41.7**	**41.8**	**41.9**	**34.9**	**38.9**	**40.9**	**41.1**	**41.4**	**41.8**
Margin Analysis																						
Gross Margin	31.6%	30.7%	31.7%	29.9%	32.7%	31.2%	28.6%	30.3%	29.8%	30.0%	30.5%	30.5%	30.0%	30.5%	31.0%	31.0%	33.9%	31.9%	30.9%	30.7%	30.2%	30.6%
Selling, General and Administrative	15.0%	13.1%	12.5%	13.5%	13.8%	13.7%	12.5%	13.0%	13.1%	13.1%	13.1%	13.4%	13.3%	13.4%	13.2%	13.2%	15.5%	16.1%	13.5%	13.3%	13.2%	13.2%
R&D	6.6%	5.8%	5.9%	6.5%	7.2%	6.7%	6.3%	6.4%	6.5%	6.6%	6.4%	6.7%	6.7%	6.7%	6.6%	6.5%	6.3%	7.2%	6.2%	6.6%	6.6%	6.6%
Operating Expenses	25.2%	21.9%	21.4%	22.8%	23.8%	23.4%	109.4%	22.3%	21.9%	21.9%	21.8%	22.2%	21.8%	21.9%	21.5%	21.4%	28.1%	29.2%	22.8%	45.7%	22.0%	21.7%
Operating Margin	6.4%	8.8%	10.3%	7.0%	8.9%	7.9%	-80.8%	8.0%	7.9%	8.1%	8.7%	8.3%	8.2%	8.6%	9.5%	9.6%	5.8%	2.7%	8.2%	-15.1%	8.2%	9.0%
Adjusted Operating Margin	9.9%	11.8%	13.2%	9.9%	11.7%	10.8%	9.8%	10.9%	10.1%	10.3%	11.0%	10.5%	10.0%	10.4%	11.2%	11.3%	12.1%	8.5%	11.2%	10.8%	10.5%	10.7%
Adjusted EBITDA Margin	12.9%	14.3%	15.1%	11.9%	14.2%	13.1%	12.0%	12.7%	12.6%	12.8%	13.5%	13.0%	12.9%	13.3%	14.2%	14.4%	14.7%	11.4%	13.6%	13.0%	13.0%	13.7%
Pretax income	3.3%	6.3%	7.2%	4.4%	6.5%	5.6%	-83.0%	6.6%	7.2%	7.4%	8.1%	7.6%	7.5%	8.0%	8.9%	9.0%	1.0%	-2.7%	5.3%	-17.2%	7.6%	8.4%
Tax Rate	55.2%	-29.2%	-33.2%	-3.0%	-26.1%	0.2%	1.2%	29.0%	30.0%	30.0%	30.0%	30.0%	31.0%	31.0%	31.0%	31.0%	6.6%	-95.1%	13.2%	-6.5%	30.0%	31.0%
Adjusted Tax Rate	-5.8%	31.2%	32.6%	20.6%	27.9%	12.3%	23.5%	29.0%	30.0%	30.0%	30.0%	30.0%	31.0%	31.0%	31.0%	31.0%	27.0%	33.8%	5.9%	23.2%	30.0%	31.0%
Net Margin	5.1%	4.5%	4.8%	4.3%	4.8%	5.6%	-84.0%	3.7%	4.2%	4.4%	4.8%	4.5%	4.5%	4.8%	5.4%	5.5%	1.0%	-0.1%	4.6%	-18.3%	4.5%	5.1%
Adjusted Net Margin	8.0%	6.8%	7.3%	6.2%	7.2%	8.0%	6.1%	7.1%	7.0%	7.1%	7.6%	7.2%	6.8%	7.1%	7.7%	7.7%	6.2%	5.2%	7.1%	7.1%	7.2%	7.3%
QoQ Increase																						
Sales and Marketing	4.3%	-1.4%	0.5%	16.4%	-6.9%	9.4%	-7.8%	-7.0%	3.0%	-1.0%	1.0%	2.0%	1.0%	2.0%	1.0%	3.0%						
Product Development	12.9%	-0.1%	3.1%	17.9%	0.8%	1.2%	-5.5%	-7.0%	1.0%	1.0%	-1.0%	4.0%	1.0%	1.0%	1.0%	2.0%						
General and Administrative	-5.7%	0.7%	-7.7%	17.3%	-7.5%	5.4%	-8.3%	-5.0%	-2.0%	1.0%	1.0%	4.0%	-3.0%	2.0%	1.0%	3.0%						
Amortization of Intangible Assets	-30.9%	-5.9%	0.7%	4.2%	-11.3%	3.8%	-1.1%	0.9%	-22.3%	0.0%	0.0%	0.0%	-17.5%	0.0%	0.0%	0.0%						

Source: Company reports, Barclays Capital estimates

Figure 179: ITRI – Historical and Projected Revenues by Segment

($ millions except per share data)	Mar-10 1Q	Jun-10 2Q	Sep-10 3Q	Dec-10 4Q	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-08 FY	Dec-09 FY	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE
Consolidated Segment Data																						
Total Itron North America Revenues	241.6	301.1	313.2	321.5	277.0	288.2	294.6	244.5	237.2	232.4	227.8	225.5	218.7	214.4	218.6	229.6	696.7	615.8	1,177.4	1,104.3	922.9	881.3
Total Itron International Revenues	256.1	266.2	260.5	299.1	286.7	324.2	321.0	314.6	319.3	325.7	335.4	342.1	349.0	359.5	370.2	377.6	1,212.9	1,071.7	1,081.9	1,246.4	1,322.5	1,456.3
Total Revenues	497.6	567.3	573.7	620.7	563.7	612.4	615.6	559.1	556.4	558.1	563.2	567.6	567.7	573.8	588.9	607.2	1,909.6	1,687.4	2,259.3	2,350.7	2,245.4	2,337.6
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
% of Sales																						
Itron North America	48.5%	53.1%	54.6%	51.8%	49.1%	47.1%	47.9%	43.7%	42.6%	41.6%	40.4%	39.7%	38.5%	37.4%	37.1%	37.8%	36.5%	36.5%	52.1%	47.0%	41.1%	37.7%
Itron International	51.5%	46.9%	45.4%	48.2%	50.9%	52.9%	52.1%	56.3%	57.4%	58.4%	59.6%	60.3%	61.5%	62.6%	62.9%	62.2%	63.5%	63.5%	47.9%	53.0%	58.9%	62.3%
Total Revenues	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% QoQ																						
Itron North America	23.2%	24.7%	4.0%	2.7%	-13.9%	4.1%	2.2%	-17.0%	-3.0%	-2.0%	-2.0%	-1.0%	-3.0%	-2.0%	2.0%	5.0%						
Itron International	-8.8%	4.0%	-2.1%	14.8%	-4.2%	13.1%	-1.0%	-2.0%	1.5%	2.0%	3.0%	2.0%	2.0%	3.0%	3.0%	2.0%						
Total Revenues	4.4%	14.0%	1.1%	8.2%	-9.2%	8.6%	0.5%	-9.2%	-0.5%	0.3%	0.9%	0.8%	0.0%	1.1%	2.6%	3.1%						
% YoY																						
Itron North America	73.3%	110.7%	128.0%	64.0%	14.7%	-4.3%	-5.9%	-24.0%	-14.4%	-19.4%	-22.7%	-7.8%	-7.8%	-7.8%	-4.0%	1.8%		-11.6%	91.2%	-6.2%	-16.4%	-4.5%
Itron International	2.8%	-1.7%	-3.9%	6.5%	12.0%	21.8%	23.2%	5.2%	11.4%	0.5%	4.5%	8.8%	9.3%	10.4%	10.4%	10.4%		-11.6%	1.0%	15.2%	6.1%	10.1%
Total Revenues	28.1%	37.1%	40.5%	30.2%	13.3%	7.9%	7.3%	-9.9%	-1.3%	-8.9%	-8.5%	1.5%	2.0%	2.8%	4.6%	7.0%		-11.6%	33.9%	4.0%	-4.5%	4.1%

Source: Company reports, Barclays Capital estimates

Figure 180: ITRI – Historical and Projected Balance Sheet

	Mar-10	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-08	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FY	FYE	FYE	FYE
BALANCE SHEET																						
ASSETS																						
Current Assets																						
Cash and Cash Equivalents	123.4	137.4	148.1	169.5	133.4	168.3	129.5	215.8	216.2	240.0	265.6	320.2	353.0	371.2	389.3	462.1	144.4	121.9	169.5	215.8	320.2	462.1
Accounts Receivables Trade, net	333.1	366.5	383.8	371.7	362.0	377.8	377.1	330.8	341.5	342.5	370.3	342.1	348.4	352.1	387.2	366.0	321.3	337.9	371.7	330.8	342.1	366.0
Inventories	194.0	201.7	225.8	208.2	248.4	253.1	240.6	192.2	248.3	235.5	218.8	207.5	248.2	240.4	231.6	206.6	164.2	170.1	208.2	192.2	207.5	206.6
Deferred Tax Assets	20.6	20.8	23.0	55.4	55.2	55.1	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	31.8	20.8	55.4	45.0	45.0	45.0
Other Current Assets	77.8	65.3	72.4	77.6	92.7	104.5	88.2	88.2	88.2	88.2	88.2	88.2	88.2	88.2	88.2	88.2	56.0	75.2	77.6	88.2	88.2	88.2
Total Current Assets	**749.0**	**791.7**	**853.0**	**882.2**	**891.7**	**958.8**	**880.4**	**871.9**	**939.1**	**951.1**	**987.9**	**1,003.0**	**1,082.8**	**1,096.9**	**1,141.2**	**1,167.9**	**717.7**	**725.9**	**882.2**	**871.9**	**1,003.0**	**1,167.9**
Property, Plant and Equipment, net	304.5	289.4	302.3	299.2	296.0	301.5	287.6	290.9	290.6	290.4	290.0	289.5	286.8	283.9	280.8	277.2	307.7	318.2	299.2	290.9	289.5	277.2
Prepaid Debt Fees	7.4	7.1	5.7	4.5	3.6												12.9	8.6	4.5	-	-	-
Deferred Tax Assets noncurrent, net	86.7	67.7	49.6	35.1	16.6	12.7	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	30.9	89.9	35.1	28.1	28.1	28.1
Other Long-Term Assets	18.9	15.6	16.3	23.8	42.5	69.0	66.9	66.9	66.9	66.9	66.9	66.9	66.9	66.9	66.9	66.9	19.3	18.1	23.8	66.9	66.9	66.9
Intangible Assets	349.7	309.0	315.8	291.7	304.8	292.9	264.2	248.1	235.5	223.0	210.4	197.8	187.5	177.1	166.8	156.4	481.9	388.2	291.7	248.1	197.8	156.4
Goodwill	1,234.1	1,146.1	1,236.6	1,209.4	1,294.5	1,311.8	714.6	714.6	714.6	714.6	714.6	714.6	714.6	714.6	714.6	714.6	1,285.9	1,305.6	1,209.4	714.6	714.6	714.6
Total Assets	**2,750.4**	**2,626.6**	**2,779.3**	**2,745.8**	**2,849.7**	**2,946.7**	**2,241.7**	**2,220.4**	**2,274.8**	**2,273.9**	**2,297.7**	**2,299.8**	**2,366.6**	**2,367.5**	**2,398.3**	**2,411.0**	**2,856.3**	**2,854.6**	**2,745.8**	**2,220.4**	**2,299.8**	**2,411.0**
LIABILITIES																						
Current Liabilities																						
Accounts Payable	230.0	235.4	238.1	241.9	252.6	268.5	260.1	222.1	256.8	235.5	235.9	216.2	261.3	240.4	244.9	229.6	200.7	219.3	241.9	222.1	216.2	229.6
Other Current Liabilities	69.8	59.7	59.8	49.2	44.8	41.6	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	66.4	64.6	49.2	31.2	31.2	31.2
Wages and Benefits Payable	79.1	85.4	96.7	110.5	85.8	94.9	83.2	83.2	83.2	83.2	83.2	83.2	83.2	83.2	83.2	83.2	78.3	71.6	110.5	83.2	83.2	83.2
Taxes Payable	20.3	18.1	22.9	19.7	29.2	28.0	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	18.6	14.4	19.7	23.8	23.8	23.8
Current Portion of Debt	10.6	10.2	226.2	228.7	231.7	234.4	15.0	-	-	-	-	-	-	-	-	-	10.8	10.9	228.7	-	-	-
Current Portion of Warranty	21.0	26.3	28.2	24.9	26.3	30.0	50.8	50.8	50.8	50.8	50.8	50.8	50.8	50.8	50.8	50.8	23.4	20.9	24.9	50.8	50.8	50.8
Unearned Revenue	50.8	38.0	30.7	28.3	42.9	49.7	43.8	43.8	43.8	43.8	43.8	43.8	43.8	43.8	43.8	43.8	24.3	40.1	28.3	43.8	43.8	43.8
Deferred Tax Liabilities, net	1.6	1.6	1.7	0.4	0.4	-	-	-	-	-	-	-	-	-	-	-	1.9	1.6	0.4	-	-	-
Total Current Liabilities	**483.2**	**474.6**	**704.4**	**703.7**	**713.8**	**747.1**	**507.9**	**454.8**	**489.6**	**468.3**	**468.7**	**449.0**	**494.1**	**473.2**	**477.7**	**462.4**	**424.4**	**443.4**	**703.7**	**454.8**	**449.0**	**462.4**
Long-Term Debt	702.3	663.2	436.7	382.2	341.6	341.1	481.3	492.5	488.7	484.9	481.1	477.3	473.5	467.9	462.3	456.7	1,141.0	770.9	382.2	492.5	477.3	456.7
Long-Term Warranty	12.4	23.0	25.0	26.4	32.9	32.8	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	14.9	12.9	26.4	28.2	28.2	28.2
Pension Plan Benefit Liability	60.1	55.0	60.0	61.5	66.9	69.7	66.6	66.6	66.6	66.6	66.6	66.6	66.6	66.6	66.6	66.6	55.8	63.0	61.5	66.6	66.6	66.6
Deferred Tax Liabilities,Noncurrent, Net	70.8	60.0	52.1	54.4	54.6	51.5	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	102.7	80.7	54.4	42.0	42.0	42.0
Other Long Term Obligations	71.9	67.9	68.4	89.3	85.1	86.9	88.7	88.7	88.7	88.7	88.7	88.7	88.7	88.7	88.7	88.7	58.7	83.2	89.3	88.7	88.7	88.7
Total Liabilities	**1,400.6**	**1,343.6**	**1,346.6**	**1,317.5**	**1,294.8**	**1,329.2**	**1,214.7**	**1,172.8**	**1,203.8**	**1,178.6**	**1,175.3**	**1,151.7**	**1,193.1**	**1,166.5**	**1,165.5**	**1,144.5**	**1,797.6**	**1,454.1**	**1,317.5**	**1,172.8**	**1,151.7**	**1,144.5**
SHAREHOLDERS' EQUITY																						
Preferred Stock	-	-	-	-	-	-	-										-	-	-	-	-	-
Common stock	1,308.0	1,315.1	1,321.3	1,328.2	1,334.2	1,339.5	1,343.9	1,343.9	1,343.9	1,343.9	1,343.9	1,343.9	1,343.9	1,343.9	1,343.9	1,343.9	992.2	1,299.1	1,328.2	1,343.9	1,343.9	1,343.9
Accumulated other comprehensive income (loss)	(15.3)	(116.0)	(1.7)	(35.0)	58.6	81.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	34.1	71.1	(35.0)	3.5	3.5	3.5
Retained Earnings	57.0	83.9	113.0	135.0	162.1	196.6	(320.5)	(299.9)	(276.5)	(252.2)	(225.0)	(199.4)	(173.9)	(146.5)	(114.7)	(81.0)	50.3	30.3	135.0	(299.9)	(199.4)	(81.0)
Cumulative Effect of Change in Accounting Principle																	(17.8)	-	-	-	-	-
Total Shareholders' Equity	**1,349.8**	**1,283.0**	**1,432.6**	**1,428.3**	**1,554.9**	**1,617.5**	**1,027.0**	**1,047.6**	**1,071.0**	**1,095.3**	**1,122.5**	**1,148.1**	**1,173.6**	**1,201.0**	**1,232.8**	**1,266.5**	**1,058.8**	**1,400.5**	**1,428.3**	**1,047.6**	**1,148.1**	**1,266.5**
Total Liabilities, redeemable stock and shareholders' equity	**2,750.4**	**2,626.6**	**2,779.3**	**2,745.8**	**2,849.7**	**2,946.7**	**2,241.7**	**2,220.4**	**2,274.8**	**2,273.9**	**2,297.7**	**2,299.8**	**2,366.6**	**2,367.5**	**2,398.3**	**2,411.0**	**2,856.3**	**2,854.6**	**2,745.8**	**2,220.4**	**2,299.8**	**2,411.0**
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Days In																						
Accounts Receivables, net	61.1	58.9	61.1	54.6	58.6	56.3	55.9	54.0	56.0	56.0	60.0	55.0	56.0	56.0	60.0	55.0	15.4	18.3	15.0	12.8	13.9	14.3
Inventories	52.0	46.8	52.6	43.6	59.7	54.8	50.0	45.0	58.0	55.0	51.0	48.0	57.0	55.0	52.0	45.0	47.5	54.0	48.7	43.0	48.3	46.5
Inventory Turns	7.5	8.0	7.3	8.0	6.7	6.7	7.1	7.2	7.1	6.5	6.9	7.4	7.0	6.5	6.9	7.6		6.9	8.3	8.1	7.8	7.8
Prepaid Debt Fees	2.0	1.6	1.3	0.9	0.9	-	-	-	-	-	-	-	-	-	-	-	16.2	23.9	18.1	19.8	20.5	19.9
Accounts Payable	61.6	54.6	55.4	50.7	60.7	58.1	54.0	52.0	60.0	55.0	55.0	50.0	60.0	55.0	55.0	50.0	58.0	69.6	56.6	49.7	50.3	51.7
Valuation Ratios																						
Return on Equity	7.5%	7.9%	7.7%	7.4%	7.0%	8.5%	-201.4%	7.9%	8.7%	8.9%	9.7%	8.9%	8.7%	9.1%	10.3%	10.6%	1.9%	-0.2%	7.3%	-41.0%	8.8%	9.3%
Return on Average Equity (LTM)	0.8%	1.0%	1.5%	1.8%	1.7%	1.8%	-10.4%	-10.4%	-10.2%	-10.2%	2.1%	2.2%	2.2%	2.2%	2.2%	2.3%	1.9%	-0.2%	7.3%	-41.0%	8.8%	9.3%
Return on Assets	3.7%	3.9%	4.0%	3.9%	3.8%	4.7%	-92.3%	3.7%	4.1%	4.3%	4.7%	4.5%	4.3%	4.6%	5.3%	5.6%	0.7%	-0.1%	3.8%	-19.3%	4.4%	4.9%
Return on Net Assets	7.5%	7.9%	7.7%	7.4%	7.0%	8.5%	-201.4%	7.9%	8.7%	8.9%	9.7%	8.9%	8.7%	9.1%	10.3%	10.6%	1.9%	-0.2%	7.3%	-41.0%	8.8%	9.3%
Return on Sales	5.1%	4.5%	4.8%	4.3%	4.8%	5.6%	-84.0%	3.7%	4.2%	4.4%	4.8%	4.5%	4.5%	4.8%	5.4%	5.5%	1.0%	-0.1%	4.6%	-18.3%	4.5%	5.1%
Liquidity Ratios																						
Current Ratio	1.6	1.7	1.2	1.3	1.2	1.3	1.7	1.9	1.9	2.0	2.1	2.2	2.2	2.3	2.4	2.5	1.7	1.6	1.3	1.9	2.2	2.5
Net Working Capital	142.4	179.7	0.5	9.0	44.5	43.5	242.9	201.3	233.3	242.9	253.5	233.9	235.7	252.5	274.2	243.4	148.9	160.6	9.0	201.3	233.9	243.4
Long Term Debt / Equity	52.0%	51.7%	30.5%	26.8%	22.0%	21.1%	46.9%	47.0%	45.6%	44.3%	42.9%	41.6%	40.3%	39.0%	37.5%	36.1%	107.8%	55.0%	26.8%	0.5	0.4	0.4
Total Debt / Equity	52.8%	52.5%	46.3%	42.8%	36.9%	35.6%	48.3%	47.0%	45.6%	44.3%	42.9%	41.6%	40.3%	39.0%	37.5%	36.1%	108.8%	55.8%	42.8%	0.5	0.4	0.4
Total Debt / Total Capital	34.6%	34.4%	31.6%	30.0%	26.9%	26.2%	32.6%	32.0%	31.3%	30.7%	30.0%	29.4%	28.7%	28.0%	27.3%	26.5%	52.1%	35.8%	30.0%	32.0%	0.3	0.3
Book Value Per Share	33.0	31.2	35.1	34.9	37.9	39.4	25.2	25.7	26.2	26.7	27.3	27.8	28.4	29.0	29.7	30.4	30.3	36.2	34.9	25.6	28.0	30.5
Cash Per Share	3.0	3.3	3.6	4.1	3.3	4.1	3.2	5.3	5.3	5.8	6.5	7.8	8.5	9.0	9.4	11.1	4.1	3.1	4.1	5.3	7.8	11.1

Source: Company reports, Barclays Capital estimates

Figure 181: ITRI – Historical and Projected Statement of Cash Flows

	Mar-10	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-08	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FY	FYE	FYE	FYE
CASH FLOW STATEMENT																						
Operating Activities																						
Net Income	25.3	25.3	27.6	26.6	27.1	34.4	(517.1)	20.6	23.4	24.3	27.2	25.6	25.5	27.4	31.8	33.6	19.8	(2.2)	104.8	(434.9)	100.5	118.3
Depreciation and Amortization	33.3	31.8	32.1	34.0	31.5	32.8	32.6	29.6	29.5	29.6	29.8	30.1	30.1	30.4	31.2	32.2	173.7	155.7	131.2	126.5	119.0	123.9
Stock Based Compensation	4.6	4.5	5.1	3.7	5.0	4.5	2.9										16.6	17.0	17.9	12.4	-	-
Amortization of Prepaid Debt Fees	1.3	1.5	1.5	1.3	1.3	1.0	3.1										8.9	8.3	5.5	5.4	-	-
Amortization of Convertible Debt Discount	2.5	2.5	2.5	2.6	2.6	2.7	-										13.4	9.7	10.1	5.3	-	-
Loss on Extinguishment of Debt	-	-	-	-	-	-	-										-	10.0	-	-	-	-
Deferred Taxes, net	(14.1)	6.0	6.9	(16.8)	7.6	(1.5)	(7.5)	-	-	-	-	-	-	-	-	-	(43.3)	(64.2)	(18.0)	(1.4)	-	-
Goodwill Impairment			-				540.4													540.4		
Other Adjustments, net	3.5	(0.2)	0.7	2.8	(2.0)	2.3	1.7										(2.2)	3.1	6.8	2.0	-	-
Changes in Operating Assets and Liabilities																				-		
Accounts Receivable	(6.2)	(46.0)	(1.3)	7.8	24.5	(36.7)	(9.8)	46.3	(10.6)	(1.0)	(27.8)	28.2	(6.3)	(3.7)	(35.1)	21.2	19.9	(3.0)	(45.6)	24.3	(11.3)	(23.9)
Inventories	(27.8)	(13.2)	(16.8)	16.3	(34.1)	(2.6)	3.9	48.4	(56.1)	12.8	16.7	11.2	(40.7)	7.9	8.8	24.9	4.9	3.5	(41.4)	15.7	(15.4)	0.9
Other Current Assets	-	8.4	(10.2)	1.8	-	(21.3)	12.6	-	-	-	-	-	-	-	-	-	-	-	-	(8.7)	-	-
Other Long-Term Assets	-	(0.8)	2.4	(1.6)	-	(23.0)	5.5	-	-	-	-	-	-	-	-	-	-	-	-	(17.5)	-	-
Accounts Payables, Other Current Liabilities, and Taxes Payable	30.8	11.7	(4.3)	2.7	11.3	5.2	(4.2)	(38.1)	34.8	(21.4)	0.5	(19.8)	45.1	(20.9)	4.5	(15.3)	(6.5)	9.9	40.9	(25.7)	(5.9)	13.4
Wages and Benefits Payable	10.3	9.4	7.2	15.4	(29.4)	7.9	(6.5)	-	-	-	-	-	-	-	-	-	7.7	(8.3)	42.2	(28.0)	-	-
Unearned Revenue	12.6	(10.3)	(5.2)	0.5	15.7	8.5	(1.3)	-	-	-	-	-	-	-	-	-	3.9	14.8	(2.4)	22.9	-	-
Warranty	0.5	13.9	2.2	(1.9)	6.4	3.1	18.5	-	-	-	-	-	-	-	-	-	(2.2)	(5.3)	14.7	28.0	-	-
Effect of FX rate changes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Operating, net	(10.7)	6.7	(0.4)	(7.6)	(31.7)	34.4	(8.7)										(21.4)	(8.2)	(12.0)	(6.0)	-	-
Goodwill								-	-	-	-	-	-	-	-	-				-		
Pension Plan Benefit Liability								-	-	-	-	-	-	-	-	-				-		
Deferred Tax Liabilities,Noncurrent, Net								-	-	-	-	-	-	-	-	-				-		
Other Long Term Obligations								-	-	-	-	-	-	-	-	-				-		
Net Cash Provided by Operating Activities	**65.8**	**51.3**	**50.0**	**87.5**	**36.0**	**51.7**	**66.1**	**106.8**	**20.9**	**44.3**	**46.3**	**75.4**	**53.7**	**41.0**	**41.3**	**96.6**	**193.1**	**140.8**	**254.6**	**260.6**	**187.0**	**232.7**
Investing Activities																						
Acquisition of PPE	(16.2)	(11.6)	(17.8)	(17.3)	(11.3)	(17.5)	(17.1)	(16.8)	(16.7)	(16.7)	(16.9)	(17.0)	(17.0)	(17.2)	(17.7)	(18.2)	(63.4)	(52.9)	(62.8)	(62.6)	(67.4)	(70.1)
Business Acquisitions, net of Cash and Equivalents	-	-	-	-	(14.8)	0.2	-										(6.9)	(4.3)	-	(14.6)	-	-
Other Investing, net	3.1	1.4	0.9	1.1	0.3	0.2	0.1										3.3	3.2	6.5	0.63	-	-
Net Cash Provided by Investing Activities	**(13.0)**	**(10.2)**	**(16.9)**	**(16.2)**	**(25.8)**	**(17.1)**	**(17.0)**	**(16.8)**	**(16.7)**	**(16.7)**	**(16.9)**	**(17.0)**	**(17.0)**	**(17.2)**	**(17.7)**	**(18.2)**	**(67.1)**	**(54.0)**	**(56.3)**	**(76.6)**	**(67.4)**	**(70.1)**
Financing Activities																						
Proceeds from Borrowing							670.0													670.0		
Payments on Debt	(52.8)	(21.0)	(32.6)	(48.6)	(52.9)	(2.7)	(748.7)	(3.8)	(3.8)	(3.8)	(3.8)	(3.8)	(3.8)	(5.6)	(5.6)	(5.6)	(388.4)	(275.8)	(155.2)	(808.1)	(15.2)	(20.6)
Issuance of Common Stock	4.5	2.3	1.1	0.8	1.1	1.4	1.0										324.5	166.4	8.8	3.5	-	-
Prepaid Debt Fees	-	-	-	(1.3)	(0.4)	0.4	-										(0.2)	(3.9)	(1.3)	-	-	-
Other Financing, net	(0.1)	(2.1)	(0.1)	1.4	(0.2)	(0.1)	(5.0)										0.7	(0.8)	(0.9)	(5.3)	-	-
Net Cash Provided by Financing Activities	**(48.4)**	**(20.9)**	**(31.6)**	**(47.7)**	**(52.4)**	**(1.0)**	**(82.7)**	**(3.8)**	**(3.8)**	**(3.8)**	**(3.8)**	**(3.8)**	**(3.8)**	**(5.6)**	**(5.6)**	**(5.6)**	**(63.4)**	**(114.1)**	**(148.6)**	**(139.9)**	**(15.2)**	**(20.6)**
Effect of foreign exchange rates on cash and cash equivalents	(2.8)	(6.3)	9.2	(2.2)	6.1	1.3	(5.2)										(10.3)	4.8	(2.1)	2.1	-	-
Net increase in cash and cash equivalents	1.5	14.0	10.7	21.4	(36.1)	34.9	(38.8)	86.3	0.4	23.8	25.6	54.6	32.9	18.2	18.1	72.8	52.4	(22.5)	47.6	46.3	104.4	142.0
Cash and cash equivalents at beginning of period	121.9	123.4	137.4	148.1	169.5	133.4	168.3	129.5	215.8	216.2	240.0	265.6	320.2	353.0	371.2	389.3	92.0	144.4	121.9	169.5	215.8	320.2
Cash and cash equivalents at end of period	123.4	137.4	148.1	169.5	133.4	168.3	129.5	215.8	216.2	240.0	265.6	320.2	353.0	371.2	389.3	462.1	144.4	121.9	169.5	215.8	320.2	462.2
Check	-	-	-	-	-	-	-										-	-	-	-	-	-

Source: Company reports, Barclays Capital estimates

Figure 182: PWER – Historical and Projected Income Statement

($ millions except per share data)	Mar-10 1Q	Jun-10 2Q	Sep-10 3Q	Dec-10 4Q	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-09 FY	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE
INCOME STATEMENT																					
Total Revenues	**152.4**	**214.5**	**314.0**	**366.2**	**244.5**	**260.3**	**245.0**	**231.7**	**231.4**	**241.4**	**255.2**	**270.7**	**260.2**	**265.4**	**272.6**	**282.7**	**431.6**	**1,047.1**	**981.6**	**998.7**	**1,080.9**
% Growth - QoQ	7%	41%	46%	17%	-33%	6%	-6%	-5%	0%	4%	6%	6%	-4%	2%	3%	4%					
% Growth - YoY	56%	135%	214%	157%	60%	21%	-22%	-37%	-5%	-7%	4%	17%	12%	10%	7%	4%	-20%	143%	-6%	2%	8%
Cost of Revenue:	106.6	135.1	184.9	217.3	160.3	172.9	176.2	163.4	162.5	167.8	177.3	186.8	180.8	184.5	188.1	195.1	335.3	644.0	672.8	694.4	748.5
Gross Profit (loss)	45.7	79.4	129.1	148.9	84.3	87.4	68.8	68.4	69.0	73.6	77.8	83.9	79.4	80.9	84.5	87.6	96.3	403.1	308.8	304.3	332.5
Operating expenses																					
Selling, General and Administrative	15.0	18.2	19.3	22.2	21.1	20.9	22.6	24.0	23.0	23.2	23.9	24.7	23.9	24.4	24.9	25.9	57.7	74.6	88.6	94.8	99.1
Research and Development	8.4	8.6	9.0	10.5	11.3	12.1	11.6	12.2	12.0	12.2	11.8	12.1	12.0	12.3	12.5	12.9	30.3	36.4	47.1	48.1	49.7
Amortization of Intangible Assets	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.6	1.5	1.9	2.0	2.0
Restructuring Costs	0.9	2.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.0	3.9	-	-	-
Goodwill Impairment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57.0	-	-	-	-
Litigation	-	-	-	22.1	0.2	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-	22.1	1.3	0.9	0.9
Total Operating Expenses	24.7	30.1	28.6	55.2	33.1	34.1	34.9	36.8	35.8	36.1	36.5	37.5	36.7	37.4	38.1	39.5	154.6	138.5	138.9	145.9	151.6
Operating Income / (Loss)	**21.1**	**49.3**	**100.5**	**93.7**	**51.2**	**53.3**	**33.9**	**31.5**	**33.2**	**37.5**	**41.4**	**46.4**	**42.7**	**43.6**	**46.4**	**48.2**	**(58.3)**	**264.6**	**169.9**	**158.5**	**180.8**
Interest Income	-	0.0	0.1	0.3	0.5	0.7	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.2	0.4	2.1	2.3	3.1
Interest Expense	(2.0)	(2.0)	(1.2)	(1.4)	(1.4)	(1.6)	(1.7)	(0.9)	(0.9)	(0.9)	(0.9)	(0.9)	(0.9)	(0.9)	(0.9)	(0.9)	(8.7)	(6.7)	(5.6)	(3.6)	(3.6)
Liquidation of Subsidiary							16.9												16.9		
Gain (Loss) on Extinguishment of Debt	(5.7)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.6	(5.7)	-	-	-
Other Income (Expense), Net	0.8	0.7	(3.0)	(0.9)	(2.2)	(4.5)	8.7	-	-	-	-	-	-	-	-	-	1.2	(2.3)	1.9	-	-
Total Other Operating Income/ (Loss)	(6.9)	(1.3)	(4.2)	(2.0)	(3.1)	(5.4)	24.3	(0.4)	(0.4)	(0.3)	(0.3)	(0.2)	(0.2)	(0.2)	(0.1)	(0.0)	1.3	(14.3)	15.3	(1.3)	(0.5)
Pretax Income / (Loss)	14.2	48.1	96.4	91.6	48.1	47.9	58.2	31.1	32.8	37.2	41.1	46.2	42.5	43.4	46.3	48.1	(57.0)	250.3	185.2	157.2	180.4
Pro forma Pretax Net Income	15.2	47.1	90.5	86.6	49.7	49.9	59.9	32.5	34.2	38.6	42.5	47.6	43.9	44.8	47.7	49.5	(58.6)	239.3	191.9	162.8	186.0
Provision for income taxes	9.7	23.3	33.1	37.6	17.5	16.6	16.8	10.9	11.5	13.0	14.4	16.2	14.9	15.2	16.2	16.9	6.9	103.6	61.7	55.0	63.1
Income before Equity in Earnings of JV	**4.5**	**24.8**	**63.3**	**54.1**	**30.6**	**31.3**	**41.4**	**20.2**	**21.3**	**24.2**	**26.7**	**30.0**	**27.6**	**28.2**	**30.1**	**31.3**	**(63.8)**	**146.6**	**123.5**	**102.2**	**117.2**
Equity in Earnings of JV	0.1	0.4	0.4	0.3	0.2	0.4	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	1.2	1.1	2.0	2.0
Net income / (loss)	**4.6**	**25.2**	**63.7**	**54.4**	**30.8**	**31.7**	**41.4**	**20.7**	**21.8**	**24.7**	**27.2**	**30.5**	**28.1**	**28.7**	**30.6**	**31.8**	**(63.3)**	**147.9**	**124.6**	**104.2**	**119.2**
Preferred Stock Dividend and Accretion	0.9	0.9	0.9	0.9	0.9	0.9	0.9	-	-	-	-	-	-	-	-	-	2.2	3.4	2.6	-	-
GAAP Net Income	3.8	24.3	62.9	53.5	29.9	30.8	40.6	20.7	21.8	24.7	27.2	30.5	28.1	28.7	30.6	31.8	(65.5)	144.4	122.0	104.2	119.2
Pro Forma Net Income	**5.5**	**23.8**	**57.5**	**49.0**	**32.2**	**33.3**	**43.1**	**21.6**	**22.7**	**25.6**	**28.1**	**31.4**	**29.0**	**29.6**	**31.5**	**32.7**	**(65.5)**	**135.7**	**130.2**	**107.8**	**122.8**
Diluted Weighted Average Common Shares Outstanding	139.6	142.3	144.2	141.8	158.4	157.8	157.8	157.8	157.9	158.0	158.1	158.2	158.3	158.4	158.5	158.6	88.1	141.9	158.0	158.1	158.5
EPS - Diluted	**0.04**	**0.17**	**0.40**	**0.35**	**0.20**	**0.21**	**0.27**	**0.14**	**0.14**	**0.16**	**0.18**	**0.20**	**0.18**	**0.19**	**0.20**	**0.21**	**(0.74)**	**0.96**	**0.82**	**0.68**	**0.78**
Margin Analysis																					
Gross Margin	30.0%	37.0%	41.1%	40.7%	34.5%	33.6%	28.1%	29.5%	29.8%	30.5%	30.5%	31.0%	30.5%	30.5%	31.0%	31.0%	22.3%	38.5%	31.5%	30.5%	30.8%
Selling, General and Administrative	9.8%	8.5%	6.1%	6.0%	8.6%	8.0%	9.2%	10.3%	9.9%	9.6%	9.4%	9.1%	9.2%	9.2%	9.1%	9.2%	13.4%	7.1%	9.0%	9.5%	9.2%
R&D	5.5%	4.0%	2.9%	2.9%	4.6%	4.6%	4.7%	5.2%	5.2%	5.0%	4.6%	4.5%	4.6%	4.6%	4.6%	4.6%	7.0%	3.5%	4.8%	4.8%	4.6%
Operating Expenses	16.2%	14.0%	9.1%	15.1%	13.5%	13.1%	14.2%	15.9%	15.5%	15.0%	14.3%	13.9%	14.1%	14.1%	14.0%	14.0%	35.8%	13.2%	14.2%	14.6%	14.0%
Operating Margin	13.8%	23.0%	32.0%	25.6%	20.9%	20.5%	13.8%	13.6%	14.3%	15.5%	16.2%	17.1%	16.4%	16.4%	17.0%	17.0%	-13.5%	25.3%	17.3%	15.9%	16.7%
Pretax income	9.3%	22.4%	30.7%	25.0%	19.7%	18.4%	23.7%	13.4%	14.2%	15.4%	16.1%	17.1%	16.3%	16.3%	17.0%	17.0%	-13.2%	23.9%	18.9%	15.7%	16.7%
Tax Rate	68.3%	48.4%	34.3%	41.0%	36.3%	34.7%	28.8%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	-12.1%	41.4%	33.3%	35.0%	35.0%
Net Margin	2.5%	11.3%	20.0%	14.6%	12.2%	11.8%	16.6%	8.9%	9.4%	10.2%	10.7%	11.3%	10.8%	10.8%	11.2%	11.2%	-15.2%	13.8%	12.4%	10.4%	11.0%
QoQ Increase																					
Selling, General and Administrative	-10.3%	21.7%	5.8%	14.9%	-4.8%	-0.9%	8.2%	6.0%	-4.0%	1.0%	3.0%	3.0%	-3.0%	2.0%	2.0%	4.0%					
Research and Development	-0.4%	2.3%	4.6%	17.2%	7.6%	7.0%	-4.2%	5.0%	-1.0%	1.0%	-3.0%	3.0%	-1.0%	2.0%	2.0%	3.0%					

Source: Company reports, Barclays Capital estimates

Figure 183: PWER – Historical and Projected Revenues by Segment

	Mar-10	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13
($ millions except per share data)	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FYE	FYE	FYE
PERFORMANCE BY SEGMENT																					
Revenues																					
Renewable Energy Solutions	82.1	142.3	228.3	262.7	151.6	180.0	174.0	163.6	161.9	168.4	178.5	191.0	185.3	189.0	194.6	202.4	128.6	715.4	669.2	699.8	771.3
Power Solutions	70.3	72.2	85.7	103.5	92.9	80.3	71.0	68.2	69.5	73.0	76.6	79.7	74.9	76.4	78.0	80.3	303.0	331.7	312.4	298.9	309.6
Total Revenues	152.4	214.5	314.0	366.2	244.5	260.3	245.0	231.7	231.4	241.4	255.2	270.7	260.2	265.4	272.6	282.7	431.6	1,047.1	981.5	998.7	1,080.9
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
% of Sales																					
Renewable Energy Solutions	53.9%	66.3%	72.7%	71.7%	62.0%	69.2%	71.0%	70.6%	70.0%	69.8%	70.0%	70.6%	71.2%	71.2%	71.4%	71.6%	29.8%	68.3%	68.2%	70.1%	71.4%
Power Solutions	46.1%	33.7%	27.3%	28.3%	38.0%	30.8%	29.0%	29.4%	30.0%	30.2%	30.0%	29.4%	28.8%	28.8%	28.6%	28.4%	70.2%	31.7%	31.8%	29.9%	28.6%
Total Revenues	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% QoQ																					
Renewable Energy Solutions	20.8%	73.3%	60.4%	15.1%	-42.3%	18.7%	-3.3%	-6.0%	-1.0%	4.0%	6.0%	7.0%	-3.0%	2.0%	3.0%	4.0%					
Power Solutions	-5.6%	2.7%	18.7%	20.8%	-10.2%	-13.6%	-11.6%	-4.0%	2.0%	5.0%	5.0%	4.0%	-6.0%	2.0%	2.0%	3.0%					
Total Revenues	7.0%	40.7%	46.4%	16.6%	-33.2%	6.5%	-5.9%	-5.4%	-0.1%	4.3%	5.7%	6.1%	-3.9%	2.0%	2.7%	3.7%					
% YoY																					
Renewable Energy Solutions	545.5%	728.7%	635.5%	286.5%	84.7%	26.5%	-23.8%	-37.7%	6.8%	-6.4%	2.6%	16.8%	14.4%	12.2%	9.0%	6.0%		456.3%	-6.5%	4.6%	10.2%
Power Solutions	-17.4%	-2.4%	24.0%	39.0%	32.1%	11.2%	-17.2%	-34.1%	-25.2%	-9.1%	8.0%	17.0%	7.8%	4.7%	1.7%	0.7%		9.5%	-5.8%	-4.3%	3.6%
Total Revenues	55.8%	135.3%	213.6%	157.1%	60.4%	21.4%	-22.0%	-36.7%	-5.3%	-7.3%	4.1%	16.8%	12.4%	9.9%	6.8%	4.4%		142.6%	-6.3%	1.8%	8.2%

Source: Company reports, Barclays Capital estimates

Figure 184: PWER – Historical and Projected Balance Sheet

($ millions except per share data)	Mar-10 1Q	Jun-10 2Q	Sep-10 3Q	Dec-10 4Q	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-09 FY	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE
BALANCE SHEET																					
ASSETS																					
Current Assets																					
Cash and Cash Equivalents	101.1	145.2	194.6	227.9	243.6	142.7	182.7	189.7	227.2	251.6	266.9	280.5	290.0	329.6	353.2	376.1	89.6	227.9	189.7	280.5	376.1
Accounts Receivables Trade, net	120.7	133.9	206.0	262.5	227.8	238.4	232.4	230.1	217.6	217.4	226.7	239.6	254.3	244.4	249.3	256.0	119.8	262.5	230.1	239.6	256.0
Other AR	2.6	4.0	5.0	8.0	6.2	6.1	5.4	-	-	-	-	-	-	-	-	-	2.8	8.0	-	-	-
Inventories	77.4	96.2	125.7	152.3	185.1	177.3	156.6	180.7	167.5	166.6	172.1	181.9	191.6	185.5	189.2	192.9	73.2	152.3	180.7	181.9	192.9
Deferred Income Tax	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prepaid Expenses and other current assets	10.8	12.7	17.3	21.7	20.9	21.8	20.3	22.2	20.6	20.5	21.2	22.4	23.6	22.8	23.3	23.7	10.6	21.7	22.2	22.4	23.7
Total Current Assets	**312.6**	**392.0**	**548.6**	**672.4**	**683.6**	**586.4**	**597.5**	**622.8**	**633.0**	**656.1**	**686.9**	**724.4**	**759.4**	**782.3**	**814.9**	**848.8**	**295.9**	**672.4**	**622.8**	**724.4**	**848.8**
Property, Plant and Equipment, net	47.3	47.3	56.5	63.3	73.1	79.7	81.4	82.3	83.2	84.0	84.9	85.8	86.8	87.7	88.7	89.6	48.9	63.3	82.3	85.8	89.6
Goodwill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Intangible Assets, net	17.9	17.1	17.1	18.8	18.5	18.8	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.6	18.8	18.0	18.0	18.0
Other Assets	8.1	8.3	6.9	7.3	9.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	7.9	7.3	8.5	8.5	8.5
Total Assets	**385.9**	**464.7**	**629.2**	**761.8**	**784.7**	**693.4**	**705.4**	**731.6**	**742.7**	**766.6**	**798.2**	**836.7**	**872.7**	**896.4**	**930.1**	**964.9**	**371.3**	**761.8**	**731.6**	**836.7**	**964.9**
LIABILITIES																					
Current Liabilities																					
Bank Credit Facilities and Notes Payable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-
Accounts Payable	101.4	146.5	187.6	213.1	168.0	143.9	141.1	146.6	135.9	135.2	139.6	147.5	155.4	150.4	153.4	156.5	89.1	213.1	146.6	147.5	156.5
Restructuring Reserve	6.6	1.1	0.8	0.5	0.3	0.1	-	-	-	-	-	-	-	-	-	-	6.9	0.5	-	-	-
Long-term Debt, Current Portion	1.3	1.2	1.3	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	1.3	0.1	-	-	-
Income Tax Payable	-	-	-	103.7	126.5	6.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	-	103.7	23.3	23.3	23.3
Other Accrued Expenses	42.9	60.3	107.5	67.3	59.8	63.4	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	38.1	67.3	64.2	64.2	64.2
Total Current Liabilities	**152.2**	**209.1**	**297.2**	**384.8**	**354.7**	**213.7**	**228.5**	**234.0**	**223.3**	**222.6**	**227.0**	**235.0**	**242.8**	**237.9**	**240.9**	**243.9**	**135.8**	**384.8**	**234.0**	**235.0**	**243.9**
Deferred Income Taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long-Term Debt, Net of Current Portion	73.2	72.6	38.4	35.9	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	78.1	35.9	36.0	36.0	36.0
Other Non-Current Liabilities	19.7	22.3	36.5	39.4	46.2	53.3	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	16.3	39.4	54.7	54.7	54.7
Redeemable Convertible Preferred Stock	18.8	19.1	19.3	19.6	19.9	20.2	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	18.5	19.6	20.4	20.4	20.4
Total Liabilities	**263.8**	**323.0**	**391.4**	**479.8**	**456.7**	**323.2**	**339.7**	**345.2**	**334.5**	**333.8**	**338.2**	**346.1**	**354.0**	**349.0**	**352.1**	**355.1**	**248.8**	**479.8**	**345.2**	**346.1**	**355.1**
																	-	-			
SHAREHOLDERS' EQUITY																	-	-			
Common stock	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Additional paid-in capital	620.2	621.4	634.7	629.7	625.9	628.0	630.4	630.4	630.4	630.4	630.4	630.4	630.4	630.4	630.4	630.4	620.3	629.7	630.4	630.4	630.4
Accumulated other comprehensive income (loss)	34.1	27.5	46.5	41.4	60.3	68.8	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	39.3	41.4	20.4	20.4	20.4
Accumulated Deficit	(532.4)	(507.3)	(443.6)	(389.2)	(358.4)	(326.7)	(285.2)	(264.5)	(242.7)	(218.1)	(190.9)	(160.4)	(132.2)	(103.5)	(72.9)	(41.1)	(537.0)	(389.2)	(264.5)	(160.4)	(41.1)
Total Shareholders' Equity	**122.0**	**141.7**	**237.8**	**282.0**	**328.0**	**370.2**	**365.7**	**386.4**	**408.2**	**432.8**	**460.1**	**490.6**	**518.7**	**547.4**	**578.0**	**609.8**	**122.6**	**282.0**	**386.4**	**490.6**	**609.8**
Total Liabilities, redeemable stock and shareholders' equity	**385.9**	**464.7**	**629.2**	**761.8**	**784.7**	**693.4**	**705.4**	**731.6**	**742.7**	**766.6**	**798.2**	**836.7**	**872.7**	**896.4**	**930.1**	**964.9**	**371.3**	**761.8**	**731.6**	**836.7**	**964.9**
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Days In																					
Accounts Receivables, net	73.8	58.7	61.3	67.4	87.3	85.7	85.7	85.7	85.7	85.7	85.7	85.7	85.7	85.7	85.7	85.7	103.6	94.3	85.6	87.6	86.5
Inventories	66.2	65.0	62.0	64.0	105.4	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	79.7	86.3	98.0	95.6	94.1
Inventory Turns	5.7	6.2	6.7	6.3	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	5.7	4.0	3.8	4.0
Prepaid Expenses	9.3	8.5	8.6	9.1	11.9	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.6	12.3	12.1	11.8	11.6
Accounts Payable	86.7	98.9	92.5	89.5	95.6	75.9	75.9	75.9	75.9	75.9	75.9	75.9	75.9	75.9	75.9	75.9	97.0	120.8	79.5	77.5	76.3
Valuation Ratios																					
Return on Equity	15.1%	71.0%	107.2%	77.1%	37.6%	34.2%	45.3%	21.4%	21.4%	22.8%	23.7%	24.9%	21.7%	21.0%	21.2%	20.9%	-51.6%	52.4%	32.3%	21.2%	19.6%
Return on Average Equity (LTM)	0.5%	6.0%	10.5%	13.1%	13.3%	12.2%	10.8%	8.1%	7.1%	6.3%	5.1%	5.3%	5.3%	5.2%	5.1%	4.9%	-51.6%	52.4%	32.3%	21.2%	19.6%
Return on Assets	4.8%	21.7%	40.5%	28.5%	15.7%	18.3%	23.5%	11.3%	11.7%	12.9%	13.6%	14.6%	12.9%	12.8%	13.2%	13.2%	-17.0%	19.4%	17.0%	12.5%	12.4%
Return on Net Assets	15.1%	71.0%	107.2%	77.1%	37.6%	34.2%	45.3%	21.4%	21.4%	22.8%	23.7%	24.9%	21.7%	21.0%	21.2%	20.9%	-51.6%	52.4%	32.3%	21.2%	19.6%
Return on Sales	3.0%	11.7%	20.3%	14.8%	12.6%	12.2%	16.9%	8.9%	9.4%	10.2%	10.7%	11.3%	10.8%	10.8%	11.2%	11.2%	-14.7%	14.1%	12.7%	10.4%	11.0%
Liquidity Ratios																					
Current Ratio	2.1	1.9	1.8	1.7	1.9	2.7	2.6	2.7	2.8	2.9	3.0	3.1	3.1	3.3	3.4	3.5	2.2	1.7	2.7	3.1	3.5
Net Working Capital	59.3	37.8	56.9	59.7	85.3	229.9	186.2	199.1	182.5	181.9	193.0	208.9	226.6	214.8	220.8	228.8	70.5	59.7	199.1	208.9	228.8
Long Term Debt / Equity	60.0%	51.3%	16.1%	12.7%	11.0%	9.7%	9.9%	9.3%	8.8%	8.3%	7.8%	7.3%	6.9%	6.6%	6.2%	5.9%	63.7%	12.7%	0.1	0.1	0.1
Total Debt / Equity	61.0%	52.1%	16.7%	12.8%	11.0%	9.7%	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	65.2%	12.8%	0.1	0.1	0.1
Total Debt / Total Capital	37.9%	34.3%	14.3%	11.3%	9.9%	8.9%	9.0%	8.5%	8.1%	7.7%	7.3%	6.8%	6.5%	6.2%	5.9%	5.6%	39.5%	11.3%	8.5%	6.8%	0.1
Book Value Per Share	0.9	1.0	1.6	2.0	2.1	2.3	2.3	2.4	2.6	2.7	2.9	3.1	3.3	3.5	3.6	3.8	1.4	2.0	2.4	3.1	3.8
Cash Per Share	0.7	1.0	1.3	1.6	1.5	0.9	1.2	1.2	1.4	1.6	1.7	1.8	1.8	2.1	2.2	2.4	1.0	1.6	1.2	1.8	2.4
Net Cash Per Share	0.20	0.51	1.08	1.35	1.31	0.68	0.93	0.97	1.21	1.36	1.46	1.55	1.60	1.85	2.00	2.14	0.1	1.4	1.0	1.5	2.1

Source: Company reports, Barclays Capital estimates

Figure 185: PWER – Historical and Projected Statement of Cash Flows

($ millions except per share data)	Mar-10 1Q	Jun-10 2Q	Sep-10 3Q	Dec-10 4Q	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-09 FY	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE
CASH FLOW STATEMENT																					
Operating Activities																					
Net Income	4.6	25.2	63.7	54.4	30.8	31.7	41.4	20.7	21.8	24.7	27.2	30.5	28.1	28.7	30.6	31.8	(63.3)	147.9	124.6	104.2	119.2
Depreciation and Amortization	5.0	3.8	3.0	3.5	4.0	4.8	1.2	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	17.1	15.4	11.1	4.4	4.9
Undistributed Earnings of JV	(0.1)	(0.4)	(0.4)	(0.3)	(0.2)	(0.4)											(0.6)	(1.2)	(0.6)	-	-
Goodwill Impairment			-	-	-	-											57.0	-	-	-	-
Asset Impairment	-	0.4	-	-	-	-											-	0.4	-	-	-
Investment Write-Off	-	-	-	-	-	-											-	-	-	-	-
Change in Fair Value of Derivative Liability	(0.2)	(0.3)	(0.1)	(0.0)	-	-											(1.1)	(0.7)	-	-	-
Stock Compensation	0.9	1.0	1.7	2.1	2.4	3.2											2.1	5.6	5.7	-	-
Exchange (gain) loss	(1.3)	0.2	3.3	0.1	1.9	3.6											(5.5)	2.4	5.5	-	-
Deferred Income Tax	-	1.6	0.6	(5.9)	-	0.9											(0.2)	(3.7)	0.9	-	-
Write-Off of Unamortized Debt Issue Costs	-	-	-	-	-	-											-	-	-	-	-
Net Loss on Debt Extinguishment	5.7	-	-	-	-	-											(8.6)	5.7	-	-	-
Net Loss on Disposable PPE	-	(0.0)	0.1	0.1	0.3	0.4											0.1	0.2	0.7	-	-
Changes in Operating Assets and Liabilities																					
AR, net	(5.0)	(20.2)	(62.3)	(56.8)	46.5	(5.0)	6.6	7.7	12.5	0.3	(9.3)	(12.9)	(14.6)	9.9	(4.9)	(6.8)	28.5	(144.2)	55.9	(9.5)	(16.4)
Inventories	(5.9)	(21.0)	(24.3)	(28.3)	(26.0)	9.7	20.76	(24.1)	13.2	0.9	(5.4)	(9.8)	(9.7)	6.1	(3.7)	(3.7)	29.7	(79.5)	(19.6)	(1.1)	(11.0)
Prepaid Expenses and Other Assets	(0.7)	(2.2)	(3.9)	(4.7)	2.0	(0.2)	1.5	(1.9)	1.6	0.1	(0.7)	(1.2)	(1.2)	0.8	(0.5)	(0.5)	2.9	(11.5)	1.4	(0.1)	(1.4)
Accounts Payable	15.9	47.4	31.4	29.3	(52.4)	(28.8)	(2.8)	5.5	(10.7)	(0.7)	4.4	8.0	7.9	(5.0)	3.0	3.0	(14.0)	124.0	(78.5)	0.9	9.0
Income Tax Payable	9.2	9.2	37.5	38.2	16.1	(118.8)	16.9	-	-	-	-	-	-	-	-	-	6.1	94.1	(85.7)	-	-
Other Accrued Expenses	(0.4)	9.5	4.8	40.3	(6.1)	4.7	0.7	-	-	-	-	-	-	-	-	-	2.2	54.1	(0.7)	-	-
Restructuring Reserve	(0.2)	(5.5)	(0.3)	(0.3)	(0.2)	(0.2)	0.1	-	-	-	-	-	-	-	-	-	3.2	(6.3)	(0.3)	-	-
Other Liabilities	1.5	2.4	12.2	(8.7)	2.4	4.4	(44.6)	-	-	-	-	-	-	-	-	-	(0.6)	7.4	(37.8)	-	-
Net Cash Provided by Operating Activities	**28.9**	**51.0**	**67.1**	**62.8**	**21.5**	**(89.9)**	**41.9**	**9.0**	**39.5**	**26.3**	**17.3**	**15.7**	**11.7**	**41.7**	**25.8**	**25.1**	**55.0**	**209.9**	**(17.5)**	**98.7**	**104.3**
Investing Activities																					
Purchases of Available for Sale Investments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Proceeds from Available for Sale Investments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acquisition of PPE	(4.2)	(4.1)	(7.9)	(11.4)	(10.7)	(8.5)	(2.1)	(2.0)	(1.9)	(1.9)	(2.0)	(2.1)	(2.2)	(2.1)	(2.2)	(2.2)	(6.7)	(27.6)	(23.4)	(7.8)	(8.7)
Proceeds from Sale of PPE	-	0.3	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.4	-	-	-
Other Assets	(0.5)	(0.1)	0.1	(0.2)	(0.2)	(0.7)	0.0	-	-	-	-	-	-	-	-	-	0.2	(0.7)	(0.8)	-	-
Acquisition of Assets of Acquired Business	-	-	-	(1.9)	-	-	-	-	-	-	-	-	-	-	-	-	-	(1.9)	-	-	-
Net Cash Provided by Investing Activities	**(4.7)**	**(3.8)**	**(7.8)**	**(13.5)**	**(10.9)**	**(9.2)**	**(2.1)**	**(2.0)**	**(1.9)**	**(1.9)**	**(2.0)**	**(2.1)**	**(2.2)**	**(2.1)**	**(2.2)**	**(2.2)**	**(6.6)**	**(29.9)**	**(24.2)**	**(7.8)**	**(8.7)**
Financing Activities																					
Proceeds from (Repayments) of Borrowings on Bank Credit Facilit	(0.5)	0.0	(0.0)	(0.0)	-	-											(20.6)	(0.5)	-	-	-
Repayments of Borrowing on Notes Payable	-	-	-	-	-	-											-	-	-	-	-
Proceeds from Issuance of LT Debt, net of debt issue costs	-	-	-	-	-	-											34.7	-	-	-	-
Repayments of Borrowings on Long Term Debt	(10.2)	(0.3)	(0.3)	(3.6)	-	(0.1)											(22.8)	(14.4)	(0.1)	-	-
Payment of Debt Issue Costs	-	-	-	-	(1.9)	(0.1)											-	-	(2.0)	-	-
Repurchase of Stock Warrants				-		-											(1.0)	-	-	-	-
Repurchases of Common Stock	-	-	(23.0)	(5.4)	(5.2)	-											-	(28.4)	(5.2)	-	-
Issuance of Preferred Stock, Net of Issue Costs	-	-	-	-		-											21.4	-	-	-	-
Issuance of Common Stock	-	1.1	(1.1)	5.7	0.4	0.0											0.0	5.7	0.4	-	-
Cash Paid to Satisfy Nonvested Share Related Employee Tax Withc	(0.0)	(0.1)	3.8	(6.5)	(0.5)	(0.3)											(0.2)	(2.9)	(0.8)	-	-
Dividends Paid	(1.2)	(0.6)	(0.6)	-	(0.6)	(0.6)											(0.9)	(2.4)	(1.2)	-	-
Net Cash Provided by Financing Activities	**(11.9)**	**0.1**	**(21.2)**	**(9.8)**	**(7.9)**	**(1.1)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**10.6**	**(42.9)**	**(8.9)**	**-**	**-**
Effect of foreign exchange rates on cash and cash equivalents	(0.7)	(3.2)	11.2	(6.1)	12.9	(0.7)											2.2	1.2	12.2	-	-
Net increase in cash and cash equivalents	11.6	44.1	49.4	33.3	15.7	(100.9)	39.8	7.0	37.6	24.4	15.3	13.6	9.5	39.5	23.6	22.9	61.1	138.4	(38.4)	90.9	95.5
Cash and cash equivalents at beginning of period	89.6	101.1	145.2	194.6	227.9	243.6	142.7	182.7	189.7	227.2	251.6	266.9	280.5	290.0	329.6	353.2	28.4	89.6	227.9	189.7	280.5
Cash and cash equivalents at end of period	101.1	145.2	194.6	227.9	243.6	142.7	182.5	189.7	227.2	251.6	266.9	280.5	290.0	329.6	353.2	376.1	89.6	227.9	189.5	280.5	376.1
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Source: Company reports, Barclays Capital estimates

Figure 186: TSLA – Historical and Projected Income Statement

	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13	Dec-14
($ thousands except per share data)	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FYE	FYE	FYE	FYE
INCOME STATEMENT																		
Total Revenues	**49.0**	**58.2**	**57.7**	**47.5**	**29.5**	**24.8**	**187.9**	**310.6**	**324.2**	**386.8**	**409.4**	**559.4**	**111.9**	**116.7**	**212.3**	**552.8**	**1,679.9**	**2,579.9**
% Growth - QoQ	35.1%	18.6%	-0.9%	-17.7%	-37.8%	-16.1%	658.9%	65.3%	4.4%	19.3%	5.8%	36.6%						
% Growth - YoY	135.6%	104.8%	84.6%	30.8%	-39.8%	-57.4%	225.8%	554.6%	998.1%	1462.6%	117.9%	80.1%	659%	4.3%	81.9%	160.3%	203.9%	53.6%
Total Cost of Revenue	31.0	39.7	40.4	37.4	23.2	20.1	172.0	264.9	264.1	304.1	314.0	418.4	102.4	86.0	148.5	480.1	1,300.6	1,947.8
Gross Profit (loss)	18.0	18.5	17.2	10.0	6.4	4.7	15.9	45.7	60.1	82.7	95.5	141.0	9.5	30.7	63.8	72.6	379.3	632.1
Operating expenses																		
Research and development	38.9	49.5	50.5	51.0	52.0	47.9	38.3	37.9	38.7	40.2	40.6	41.4	19.3	88.9	189.9	176.1	160.9	178.0
Selling, general and administrative	20.7	21.0	23.5	24.9	26.2	27.0	26.4	26.7	27.7	27.2	28.0	29.4	42.2	67.8	90.1	106.2	112.4	118.7
Stock based compensation	5.8	6.7	7.7	9.0	9.0	9.0	9.5	9.5	10.0	10.0	11.0	11.0		20.9	29.2	37.0	42.0	45.0
Total Operating Expenses	65.4	77.2	81.7	84.9	87.2	83.8	74.2	74.1	76.4	77.4	79.6	81.8	61.4	177.6	309.2	319.3	315.2	341.7
Operating Income / (Loss)	**(47.3)**	**(58.7)**	**(64.5)**	**(74.9)**	**(80.8)**	**(79.1)**	**(58.3)**	**(28.4)**	**(16.3)**	**5.3**	**15.9**	**59.2**	**(51.9)**	**(146.8)**	**(245.5)**	**(246.7)**	**64.1**	**290.4**
Adjusted EBIT	**(41.4)**	**(51.8)**	**(56.8)**	**(65.9)**	**(71.8)**	**(70.1)**	**(48.8)**	**(18.9)**	**(6.3)**	**15.3**	**26.9**	**70.2**		**(125.7)**	**(215.9)**	**(209.7)**	**106.1**	**335.4**
Adjusted EBITDA	**(37.9)**	**(47.5)**	**(52.4)**	**(61.2)**	**(68.3)**	**(67.2)**	**(45.0)**	**(14.2)**	**(1.4)**	**21.1**	**33.0**	**78.6**		**(115.1)**	**(199.0)**	**(194.7)**	**131.3**	**374.1**
Interest income	0.0	0.0	0.1	0.8	0.7	0.8	0.6	0.9	0.9	0.4	0.4	0.4	0.2	0.3	1.0	3.0	2.1	2.1
Interest expense	-	-	-	-	-	-	-	-	-	-	-	-	(2.5)	(1.0)	-	-	-	-
Other expense, net	(1.5)	(0.1)	(0.6)										(1.4)	(6.6)	(2.2)	-	-	
Loss before income taxes	(48.8)	(58.8)	(65.0)	(74.1)	(80.1)	(78.4)	(57.7)	(27.5)	(15.4)	5.7	16.3	59.6	(55.7)	(154.2)	(246.6)	(243.7)	66.2	292.5
Change in fair value of warrant liabilities	1.4	0.3												5.0	1.8	-	-	-
PF Loss before income taxes	(41.4)	(51.5)	(57.3)	(65.1)	(71.1)	(69.4)	(48.2)	(18.0)	(5.4)	15.7	27.3	70.6		(128.0)	(215.3)	(206.7)	108.2	337.5
Provision for income taxes	0.2	0.1	0.1	-	-	-	-	-	-	-	-	-	0.0	0.2	0.4	-	-	70.2
Net Income	(48.9)	(58.9)	(65.1)	(74.1)	(80.1)	(78.4)	(57.7)	(27.5)	(15.4)	5.7	16.3	59.6	(55.7)	(154.3)	(247.0)	(243.7)	66.2	222.3
PF Net Income	(41.6)	(51.6)	(57.4)	(65.1)	(71.1)	(69.4)	(48.2)	(18.0)	(5.4)	15.7	27.3	70.6		(128.2)	(215.7)	(206.7)	108.2	267.3
Net loss per share attributable to common stockholders - basic	(0.51)	(0.60)	(0.63)	(0.71)	(0.77)	(0.75)	(0.55)	(0.26)	(0.15)	0.05	0.15	0.56	(7.94)	(3.06)	(2.46)	(2.32)	0.62	2.08
PF EPS	**(0.44)**	**(0.53)**	**(0.55)**	**(0.62)**	**(0.68)**	**(0.66)**	**(0.46)**	**(0.17)**	**(0.05)**	**0.15**	**0.26**	**0.66**		**(2.54)**	**(2.15)**	**(1.97)**	**1.02**	**2.50**
Weighted average number of common shares outstanding - ba	95.2	97.8	104.1	104.4	104.7	105.0	105.3	105.6	105.9	106.2	106.5	106.8	7.0	50.4	100.3	105.1	106.3	107.1
Margin Analysis																		
Gross Margin	36.8%	31.8%	29.9%	21.1%	21.5%	18.9%	8.5%	14.7%	18.5%	21.4%	23.3%	25.2%	8.5%	26.3%	30.0%	13.1%	22.6%	24.5%
SG&A	42.3%	36.1%	40.7%	52.5%	88.6%	108.9%	14.1%	8.6%	8.6%	7.0%	6.8%	5.3%	37.7%	58.1%	42.5%	19.2%	6.7%	4.6%
R&D	79.3%	85.1%	87.6%	107.5%	176.2%	193.3%	20.4%	12.2%	11.9%	10.4%	9.9%	7.4%	17.2%	76.1%	89.4%	31.9%	9.6%	6.9%
Operating Expenses	133.3%	132.8%	141.7%	179.0%	295.3%	338.6%	39.5%	23.9%	23.6%	20.0%	19.4%	14.6%	54.9%	152.1%	145.7%	57.8%	18.8%	13.2%
Operating Margin	-96.6%	-101.0%	-111.8%	-157.8%	-273.8%	-319.7%	-31.0%	-9.1%	-5.0%	1.4%	3.9%	10.6%	-46.4%	-125.8%	-115.6%	-44.6%	3.8%	11.3%
Adjusted EBIT	-84.5%	-89.1%	-98.4%	-138.9%	-243.3%	-283.3%	-26.0%	-6.1%	-1.9%	4.0%	6.6%	12.6%	0.0%	-107.7%	-101.7%	-37.9%	6.3%	13.0%
Adjusted EBITDA	-77.3%	-81.6%	-90.9%	-128.9%	-231.3%	-271.3%	-24.0%	-4.6%	-0.4%	5.5%	8.1%	14.1%		-98.6%	-93.7%	-35.2%	7.8%	14.5%
Pretax income	-99.5%	-101.0%	-112.7%	-156.1%	-271.3%	-316.6%	-30.7%	-8.9%	-4.8%	1.5%	4.0%	10.7%	-49.8%	-132.0%	-116.2%	-44.1%	3.9%	11.3%
Tax Rate	-0.3%	-0.2%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.2%	0.0%	0.0%	24.0%
Net Margin	-99.8%	-101.3%	-112.9%	-156.1%	-271.3%	-316.6%	-30.7%	-8.9%	-4.8%	1.5%	4.0%	10.7%	-49.7%	-132.2%	-116.3%	-44.1%	3.9%	8.6%
QoQ Increase																		
SG&A	5.5%	1.2%	11.9%	6.1%	5.0%	3.0%	-2.0%	1.0%	4.0%	-2.0%	3.0%	5.0%						
R&D	9.3%	27.4%	2.0%	1.0%	2.0%	-8.0%	-20.0%	-1.0%	2.0%	4.0%	1.0%	1.9%						

Source: Company reports, Barclays Capital estimates

Figure 187: TSLA – Historical and Projected Revenues by Segment

($ thousands except per share data)	Mar-11 1Q	Jun-11 2Q	Sep-11 3Q	Dec-11 4QE	Mar-12 1QE	Jun-12 2QE	Sep-12 3QE	Dec-12 4QE	Mar-13 1QE	Jun-13 2QE	Sep-13 3QE	Dec-13 4QE	Dec-09 FY	Dec-10 FY	Dec-11 FYE	Dec-12 FYE	Dec-13 FYE	Dec-14 FYE
REVENUES BY SEGMENT																		
Total Vehicle, options and related sales	20.5	27.6	28.0	21.4	16.4	17.5	171.4	294.5	308.7	371.7	394.6	544.8	111.6	75.5	97.4	499.8	1,619.8	2,479.8
Total Units (in 000s)	145.0	190.0	184.0	142.0	110.0	117.0	1,864.0	3,244.0	3,500.0	4,300.0	4,700.0	6,500.0	830.0	567.0	661.0	5,335.0	19,000.0	31,000.0
QoQ Growth	-2.7%	31.0%	-3.2%	-22.8%	-22.5%	6.4%	1493.2%	74.0%	7.9%	22.9%	9.3%	38.3%						
YoY Growth	15.1%	34.8%	21.9%	-4.7%	-24.1%	-38.4%	913.0%	2184.5%	3081.8%	3575.2%	152.1%	100.4%	675.7%	-31.7%	16.6%	707.1%	256.1%	63.2%
Cumulative Shipments	*1,649.0*	*1,839.0*	*2,023.0*	*2,165.0*	*2,275.0*	*2,392.0*	*4,256.0*	*7,500.0*	*11,000.0*	*15,300.0*	*20,000.0*	*25,500.0*	*937.0*	*1,504.0*	*2,165.0*	*7,500.0*	*26,500.0*	*57,500.0*
Average ASP ($ 000)	141.2	145.1	152.2	150.7	149.1	149.1	92.0	90.8	88.2	86.4	84.0	83.8	134.4	133.1	147.4	93.7	85.3	80.0
Powertrain component and related sales	13.2	11.5	15.2	15.2	5.0	0.0	10.0	10.0	10.0	10.0	10.0	10.0	0.4	21.6	55.1	25.0	40.0	80.0
QoQ Growth	43.6%	-13.0%	33.0%	0.0%	NA	NA	NA	0.0%	0.0%	0.0%	0.0%	0.0%						
YoY Growth	428.6%	136.9%	197.0%	66.2%	-62.0%	-100.0%	-34.4%	-34.4%	100.0%	NA	0.0%	0.0%		5471.9%	154.8%	-54.6%	60.0%	100.0%
Total Automotive sales	33.6	39.0	43.2	36.6	21.4	17.5	181.4	304.5	318.7	381.7	404.6	554.8	111.9	97.1	152.5	524.8	1,659.8	2,559.8
Development services	15.4	19.1	14.4	10.8	8.1	7.3	6.4	6.1	5.5	5.2	4.9	4.6	-	19.7	59.8	28.0	20.1	20.1
QoQ Growth	116.5%	24.3%	-24.6%	-25.0%	-25.0%	-10.0%	-12.0%	-5.0%	-10.0%	-6.0%	-6.0%	-5.0%						
YoY Growth	6685.0%	331.7%	82.9%	52.1%	-47.3%	-61.8%	-55.5%	-43.6%	-32.3%	-29.3%	-24.5%	-24.5%			204.1%	-53.2%	-28.0%	0.0%
Total Revenues	49.0	58.2	57.7	47.5	29.5	24.8	187.9	310.6	324.2	386.8	409.4	559.4	111.9	116.7	212.3	552.8	1,679.9	2,579.9
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
% of Sales																		
Total Automotive sales	68.6%	67.1%	75.0%	77.2%	72.5%	70.5%	96.6%	98.0%	98.3%	98.7%	98.8%	99.2%	100.0%	83.2%	71.8%	94.9%	98.8%	99.2%
Development services	31.4%	32.9%	25.0%	22.8%	27.5%	29.5%	3.4%	2.0%	1.7%	1.3%	1.2%	0.8%	0.0%	16.8%	28.2%	5.1%	1.2%	0.8%
Total Revenues	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
% Growth QoQ																		
Total Automotive sales	15.3%	16.1%	10.8%	-15.3%	-41.6%	-18.5%	939.8%	67.8%	4.7%	19.8%	6.0%	37.1%						
Development services	116.5%	24.3%	-24.6%	-25.0%	-25.0%	-10.0%	-12.0%	-5.0%	-10.0%	-6.0%	-6.0%	-5.0%						
Total Revenues	35.12%	18.6%	-0.9%	-17.7%	-37.8%	-16.1%	658.9%	65.3%	4.4%	19.3%	5.8%	36.6%						
% Growth YoY																		
Total Automotive sales	63.4%	62.8%	85.2%	25.6%	-36.3%	-55.3%	319.7%	731.3%	1388.8%	2087.2%	123.0%	82.2%	659.3%	-13.3%	57.1%	244.1%	216.3%	54.2%
Development services	6685.0%	331.7%	82.9%	52.1%	-47.3%	-61.8%	-55.5%	-43.6%	-32.3%	-29.3%	-24.5%	-24.5%			204.1%	-53.2%	-28.0%	0.0%
Total Revenues	135.6%	104.8%	84.6%	30.8%	-39.8%	-57.4%	225.8%	554.6%	998.1%	1462.6%	117.9%	80.1%	659.3%	4.3%	81.9%	160.3%	203.9%	53.6%

Source: Company reports, Barclays Capital estimates

Figure 188: TSLA – Historical and Projected Balance Sheet

	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13	Dec-14
($ thousands except per share data)	1Q	2Q	3Q	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FYE	FYE	FYE	FYE
BALANCE SHEET																		
ASSETS																		
Current Assets																		
Cash and Cash Equivalents	100.7	319.4	213.3	181.8	196.8	137.7	233.4	229.9	65.7	73.5	76.9	163.3	69.6	99.6	181.8	229.9	163.3	(1.5)
Restricted Cash	42.9	11.3	55.3	55.3	55.3	55.3	55.3	55.3	55.3	55.3	55.3	55.3	-	73.6	55.3	55.3	55.3	55.3
Accounts Receivables, net	20.3	23.3	18.3	13.0	6.5	5.4	10.3	17.0	17.8	21.2	22.4	30.7	3.5	6.7	13.0	17.0	30.7	42.4
Inventory	50.8	54.3	49.2	41.0	10.2	77.0	47.1	72.6	72.4	83.3	86.0	114.6	23.2	45.2	41.0	72.6	114.6	133.4
Prepaid Expenses and other current assets	12.2	9.5	11.0	8.2	5.1	4.4	37.7	58.1	57.9	66.7	68.8	91.7	4.2	10.8	8.2	58.1	91.7	106.7
Total Current Assets	**226.9**	**417.8**	**347.1**	**299.3**	**273.8**	**279.9**	**383.8**	**432.9**	**269.0**	**300.0**	**309.5**	**455.6**	**100.6**	**235.9**	**299.3**	**432.9**	**455.6**	**336.4**
Operating lease vehicles, net	9.1	10.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	-	8.0	11.7	11.7	11.7	11.7
Property, plant and equipment, net	143.4	189.6	248.1	301.4	312.6	322.0	412.2	488.3	532.1	564.9	599.7	647.3	23.5	114.6	301.4	488.3	647.3	815.0
Restricted Cash	4.9	5.4	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	3.6	4.9	5.8	5.8	5.8	5.8
Other Assets	22.9	22.8	87.6	87.6	87.6	87.6	87.6	87.6	87.6	87.6	87.6	87.6	2.8	22.7	87.6	87.6	87.6	87.6
Total Assets	**407.3**	**646.2**	**700.3**	**705.8**	**691.5**	**707.0**	**901.1**	**1,026.3**	**906.1**	**970.0**	**1,014.3**	**1,208.0**	**130.4**	**386.1**	**705.8**	**1,026.3**	**1,208.0**	**1,256.5**
LIABILITIES																		
Current Liabilities																		
Accounts payable	49.7	57.2	86.3	69.7	38.1	33.0	263.8	406.5	289.4	333.3	344.1	458.5	15.1	29.0	69.7	406.5	458.5	189.4
Accrued liabilities	19.8	25.0	-	-	-	-	-	-	-	-	-	-	14.5	20.9	-	-	-	-
Deferred development compensation	-	-	-	-	-	-	-	-	-	-	-	-	0.2		-	-	-	-
Deferred revenue	3.8	3.1	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	1.4	4.6	5.8	5.8	5.8	5.8
Capital lease obligations, current portion	0.3	0.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.3	0.3	1.0	1.0	1.0	1.0
Reservation Payments	39.4	53.2	65.2	72.5	81.0	91.0	102.5	115.7	130.7	147.7	166.7	188.0	26.0	30.8	72.5	115.7	188.0	289.1
Total Current Liabilities	**113.0**	**138.7**	**158.4**	**149.0**	**125.9**	**130.8**	**373.1**	**529.0**	**427.0**	**487.8**	**517.6**	**653.4**	**57.5**	**85.6**	**149.0**	**529.0**	**653.4**	**485.3**
Common stock warrant liability	7.5	7.8	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	-	6.1	8.2	8.2	8.2	8.2
Convertible preferred stock warrant liability	-	-	-	-	-	-	-	-	-	-	-	-	1.7		-	-	-	-
Capital lease obligations, less current portion	0.4	0.4	-	-	-	-	-	-	-	-	-	-	0.8	0.5	-	-	-	-
Deffered revenue, less current portion	3.1	3.2	-	-	-	-	-	-	-	-	-	-	1.2	2.8	-	-	-	-
Long-term debt	102.5	134.2	225.0	305.1	385.1	465.0	465.0	452.3	439.6	426.9	414.2	401.5	-	71.8	305.1	452.3	401.5	350.7
Other long-term liabilities	13.1	13.4	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	3.5	12.3	14.6	14.6	14.6	14.6
Total liabilities	**239.6**	**297.7**	**406.1**	**476.9**	**533.7**	**618.6**	**860.9**	**1,004.1**	**889.3**	**937.5**	**954.6**	**1,077.6**	**64.7**	**179.0**	**476.9**	**1,004.1**	**1,077.6**	**858.8**
Convertible Preferred Stock	-	-	-	-	-	-	-	-	-	-	-	-	319.2	-	-	-	-	-
SHAREHOLDERS' EQUITY																		
Common stock	0.1	0.1	-	-	-	-	-	-	-	-	-	-	0.0	0.1	-	-	-	-
Additional paid-in capital	631.6	871.2	294.1	294.1	294.1	294.1	294.1	294.1	294.1	294.1	294.1	294.1	7.1	621.9	294.1	294.1	294.1	294.1
Accumulated deficit	(463.9)	(522.8)	-	**(65.1)**	**(136.2)**	**(205.5)**	**(253.7)**	**(271.8)**	**(277.2)**	**(261.5)**	**(234.2)**	**(163.6)**	(260.7)	(415.0)	(65.1)	(271.8)	(163.6)	103.7
Total stockholders' equity	**167.7**	**348.5**	**294.1**	**229.0**	**157.9**	**88.6**	**40.4**	**22.4**	**16.9**	**32.7**	**59.9**	**130.6**	**(253.5)**	**207.0**	**229.0**	**22.4**	**130.6**	**397.8**
Total liabilities, convertible preferred stock, and stockho	**407.3**	**646.2**	**700.3**	**706.0**	**691.6**	**707.2**	**901.3**	**1,026.4**	**906.3**	**970.1**	**1,014.5**	**1,208.2**	**130.4**	**386.1**	**706.0**	**1,026.4**	**1,208.2**	**1,256.6**
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Days In																		
Accounts Receivables	37.7	36.6	28.9	25.0	20.0	20.0	5.0	5.0	5.0	5.0	5.0	5.0	11.4	21.0	22.3	11.2	6.7	6.0
Inventories	149.6	125.0	111.0	100.0	40.0	350.0	25.0	25.0	25.0	25.0	25.0	25.0	82.8	191.7	100.8	55.2	32.2	25.0
Inventory Turns	2.6	3.0	3.1	3.3	3.6	1.8	11.1	17.7	14.6	15.6	14.8	16.7	8.8	2.5	3.4	8.5	13.9	15.7
Prepaid Expenses / Other	36.0	21.9	24.7	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	15.0	46.0	20.2	44.1	25.7	20.0
Accounts Payable	146.2	131.6	194.7	170.0	150.0	150.0	140.0	140.0	100.0	100.0	100.0	100.0	53.8	122.9	171.3	309.0	128.7	35.0
Other Accrued Liabilities	58.3	57.5	-	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	51.8	88.9	-	-	-	50.0
Liquidity Ratios																		
Current Ratio	2.0	3.0	2.2	2.0	2.2	2.1	1.0	0.8	0.6	0.6	0.6	0.7	1.7	2.8	2.0	0.8	0.7	0.7
Net Working Capital	13.3	(40.4)	(24.6)	(31.5)	(48.9)	11.3	(222.7)	(326.0)	(223.7)	(261.4)	(285.1)	(361.1)	(26.6)	50.8	(31.5)	(326.0)	(361.1)	(147.5)
Long-Term Debt / Equity	61.1%	38.5%	76.5%	133.2%	243.8%	525.0%	1151.5%	2022.4%	2594.7%	1307.2%	691.2%	307.5%	0.0%	34.7%	133.2%	2022.4%	307.5%	88.2%
Total Debt / Equity	61.1%	38.5%	76.5%	133.2%	243.8%	525.0%	1151.5%	2022.4%	2594.7%	1307.2%	691.2%	307.5%	0.0%	34.7%	133.2%	2022.4%	307.5%	88.2%
Total Debt / Total Capital	20.1%	17.2%	24.3%	30.2%	35.8%	39.7%	34.0%	30.6%	32.7%	30.6%	29.0%	24.9%	0.0%	15.7%	30.2%	30.6%	24.9%	21.8%
Book Value Per Share	1.8	3.6	2.8	2.2	1.5	0.8	0.4	0.2	0.2	0.3	0.6	1.2	(36.1)	4.1	2.3	0.2	1.2	3.7
Cash Per Share	1.1	3.3	2.0	1.7	1.9	1.3	2.2	2.2	0.6	0.7	0.7	1.5	9.9	2.0	1.8	2.2	1.5	(0.0)
Net Cash Per Share	(0.0)	1.9	(0.1)	(1.2)	(1.8)	(3.1)	(2.2)	(2.1)	(3.5)	(3.3)	(3.2)	(2.2)	9.9	0.6	(1.2)	(2.1)	(2.2)	(3.3)

Source: Company reports, Barclays Capital estimates

Figure 189: TSLA – Historical and Projected Statement of Cash Flows

	Mar-11	Jun-11	Sep-11	Dec-11	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13	Dec-14
($ thousands except per share data)	1Q	2Q	3QE	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE	FY	FY	FYE	FYE	FYE	FYE
CASH FLOW STATEMENT																		
Operating Activities																		
Net Income	(48.9)	(58.9)	(57.4)	(65.1)	(71.1)	(69.4)	(48.2)	(18.0)	(5.4)	15.7	27.3	70.6	(55.7)	(154.3)	(230.3)	(206.7)	108.2	267.3
Adjustments:															-	-	-	
Depreciation and amortization	3.5	4.3	4.3	4.7	3.5	3.0	3.8	4.7	4.9	5.8	6.1	8.4	6.9	10.6	16.9	14.9	25.2	38.7
Change in fair value of warrant liabilities	1.4	0.3											-	5.0	1.8	-	-	-
Change in fair value of convertible preferred stock warrant	-	-											1.1	-	-	-	-	-
Gain on extinguisment of convertible notes and warrants	-	-											(1.5)	-	-	-	-	-
Stock-based compensation	5.9	6.9											1.4	21.2	12.9	-	-	-
Excess tax benefits from stock-based compensation	-	-											-	(0.1)	-	-	-	-
Loss on abandonment of fixed assets	0.0	(0.0)											0.4	0.0	-	-	-	-
Inventory write-downs	0.4	0.3											1.4	1.0	0.7	-	-	-
Other	-	0.2											2.7	-	0.2	-	-	-
Changes in operating assets and liabilities															-	-	-	-
Accounts receivable	(13.6)	(3.0)	5.1	5.2	6.5	1.0	(4.9)	(6.7)	(0.7)	(3.4)	(1.2)	(8.2)	(0.2)	(3.2)	(6.3)	(4.0)	(13.6)	(11.8)
Inventories	(5.5)	(7.5)	5.1	8.2	30.9	(66.9)	29.9	(25.5)	0.2	(11.0)	(2.7)	(28.6)	(7.9)	(20.1)	0.3	(31.6)	(42.1)	(18.8)
Prepaid expenses and other current assets	(1.4)	1.6	(1.5)	2.8	3.1	0.7	(33.3)	(20.4)	0.2	(8.8)	(2.2)	(22.9)	(2.0)	(5.0)	1.5	(49.9)	(33.6)	(15.0)
Operating lease assets	(1.5)	1.5											-	(8.4)	-	-	-	-
Other assets	(0.4)	(0.0)											(0.4)	(0.5)	(0.4)	-	-	-
Accounts payable and accrued liabilities	7.7	18.4	4.1	(16.6)	(31.7)	(5.1)	230.8	142.6	(117.0)	43.9	10.8	114.5	4.3	13.1	13.7	336.7	52.1	(269.2)
Deferred development compensation	-	-	-										(10.0)	(0.2)	-	-	-	-
Deferred revenue	(0.5)	(0.6)	2.7	-	-	-	-	-	-	-	-	-	(1.5)	4.8	1.6	-	-	-
Reservation payments	8.7	13.8	12.0	7.3	8.5	10.0	11.5	13.3	15.0	17.0	19.0	21.3	(22.0)	4.7	41.7	43.3	72.3	101.2
Other long-term liabilities	0.8	0.3											2.2	3.5	1.1	-	-	-
Net Cash Provided by Operating Activities	**(43.3)**	**(22.5)**	**(21.5)**	**(53.5)**	**(50.2)**	**(126.6)**	**189.7**	**89.9**	**(102.9)**	**59.2**	**57.1**	**155.0**	**(80.8)**	**(127.8)**	**(140.7)**	**102.8**	**168.4**	**92.4**
Investing Activities																		
Payments related to acquisition of Fremont manufacturin	-	-											-	(65.2)	-	-	-	-
Purchases of property and equipment	(20.5)	(54.3)	(87.2)	(58.0)	(14.8)	(12.4)	(93.9)	(80.8)	(48.6)	(38.7)	(40.9)	(55.9)	(11.9)	(40.2)	(220.0)	(201.8)	(184.2)	(206.4)
Transfer of restricted cash into our dedicated Department	-	-											-	(100.0)	-	-	-	-
Withdrawals out of our dedicated Department of Energy a	30.7	31.7	91.0	79.9	79.9	79.9	-	-	-	-	-	-	-	26.4	233.3	159.9	-	-
Increase in other restricted cash	(0.1)	(0.5)											(2.4)	(1.3)	(0.6)	-	-	-
Net Cash Provided by Investing Activities	**10.1**	**(23.1)**	**(178.2)**	**21.9**	**65.2**	**67.6**	**(93.9)**	**(80.8)**	**(48.6)**	**(38.7)**	**(40.9)**	**(55.9)**	**(14.2)**	**(180.3)**	**(169.3)**	**(42.0)**	**(184.2)**	**(206.4)**
Financing Activities																		
Proceeds from issuance of common stock in initial public	-	-											-	188.8	-	-	-	-
Proceeds from issuance of common stock in a follow-on	-	172.4													172.4	-	-	-
Proceeds from issuance of common stock in private place	-	59.1											-	80.0	59.1	-	-	-
Proceeds from issuance of Series F convertible preferred s	-	-											82.4	-	-	-	-	-
Proceeds from issuance of Series E convertible preferred s	-	-											49.4	-	-	-	-	-
Principal payments on capital leases and other debt	(0.1)	(0.1)						(12.7)	(12.7)	(12.7)	(12.7)	(12.7)	(0.3)	(0.3)	(0.1)	(12.7)	(50.8)	(50.8)
Proceeds from long-term debt	30.7	31.7											-	71.8	62.3	-	-	-
Proceeds from issuance of convertible notes and warrants	-	-											25.5	-	-	-	-	-
Proceeds from exercise of stock options and other stock is	3.7	1.2											0.5	1.4	4.9	-	-	-
Excess tax benefits from stock-based compensation	-												-	0.1	-	-	-	-
Deferred common stock and loan facility issuance costs	-	-											(2.0)	(3.7)	-	-	-	-
Net Cash Provided by Financing Activities	**34.3**	**264.3**	**93.6**	**-**	**-**	**-**	**-**	**(12.7)**	**(12.7)**	**(12.7)**	**(12.7)**	**(12.7)**	**155.4**	**338.0**	**392.2**	**(12.7)**	**(50.8)**	**(50.8)**
Net increase (decrease) in cash and cash equivalents	**1.1**	**218.7**	**(106.1)**	**(31.5)**	**15.0**	**(59.1)**	**95.7**	**(3.5)**	**(164.3)**	**7.8**	**3.5**	**86.4**	**60.4**	**29.9**	**82.2**	**48.1**	**(66.6)**	**(164.8)**
Cash and cash equivalents at beginning of period	99.6	100.7	319.4	213.3	181.8	196.8	137.7	233.4	229.9	65.7	73.5	76.9	9.3	69.6	99.6	181.8	229.9	163.3
Cash and cash equivalents at end of period	100.7	319.4	213.3	181.8	196.8	137.7	233.4	229.9	65.7	73.5	76.9	163.3	69.6	99.6	181.8	229.9	163.3	(1.5)
Check	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capex as a % of sales	41.8%	93.4%	151.2%	122.3%	50.0%	50.0%	50.0%	26.0%	15.0%	10.0%	10.0%	10.0%	10.6%	34.4%	103.6%	36.5%	11.0%	8.0%
Depreciation and amortization assumptions	7.2%	7.4%	7.5%	10.0%	12.0%	12.0%	2.0%	1.5%	1.5%	1.5%	1.5%	1.5%	6.2%	9.1%	8.0%	2.7%	1.5%	1.5%

Source: Company reports, Barclays Capital estimates

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Valuation Methodology and Risks

U.S. Clean Technology & Renewables

A123 Systems Inc. (AONE)

Valuation Methodology: Our $4 price target is based on a ~0.9x EV/Sales multiple on our CY13 sales estimate of $555.5M.

Risks which May Impede the Achievement of the Price Target: Key risks to AONE's business is limited near-term volumes from key emerging OEM customers, prolonged timing for longer-term contract wins, and the company's inability to secure additional financing in order to support longer-term operations.

Ameresco Inc. (AMRC)

Valuation Methodology: Our price target of $14 equates to ~14x our CY13 EPS estimate of $0.97

Risks which May Impede the Achievement of the Price Target: Given AMRC position as the leading independent ESCO in the North American market, we believe the company is well positioned to capture growing opportunities as government and other organizations look to tap third party financing in order to meet various energy efficiency / renewables standards. Our price target of $14 equates to ~14x our CY13 EPS estimate of $0.97.

Elster Group SE (ELT)

Valuation Methodology: Our $18 price target equates to ~13x our CY13 EPS estimate of $1.41.

Risks which May Impede the Achievement of the Price Target: A more prolonged deployment of next generation smart grid technologies in regions outside of the U.S. would negatively impact Elster's top line trajectory and thus serves as a major risk to growth in the company's revenue line. Additional pricing pressure as other vendors look to capture incremental share as well as further consolidation in the market are key risks as well.

First Solar Inc. (FSLR)

Valuation Methodology: Our target of $52 represents a peer multiple of ~6x our CY13 EPS estimate of $8.23.

Risks which May Impede the Achievement of the Price Target: First Solar's risks include operating in a highly competive market filled with low-cost providers as well as dependence on an industry that remains dependent on government subsidies for at least the near-term. Ongoing margin pressure as well as diminished government support may ultimately influence the pace of First Solar's top and bottom line trajectory. Moreover, recent management departures signal limited visibility on the company's strategy in navigating the current market.

GT Advanced Technologies Inc. (GTAT)

Valuation Methodology: Our $9 price target equates to ~6x our CY13 EPS estimate of $1.65, broadly in-line with solar peers.

Risks which May Impede the Achievement of the Price Target: Given recent declines in orders across GTAT's business lines, a more prolonged slump in the company's core end markets (i.e. solar and sapphire) coupled with further pricing reductions could continue to negatively impact its top line trajectory. Reduced overhead absorption could exacerbate the negative impact of declining sales to the company's bottom line.

Itron Inc. (ITRI)

Valuation Methodology: Our $41 target equates to 10x our CY13 EPS estimate of $4.10.

Risks which May Impede the Achievement of the Price Target: Key risks to our outlook include ITRI's inability to offset demand declines in its core North American market, a more prolonged rollout of smartmeter deployments in Europe and the rest of the world, as well as potential execution risk given recent changes to the company's management team.

Power-One Inc. (PWER)

Valuation Methodology: Our $7 price target equates to ~9x our CY13 EPS estimate of $0.78.

Risks which May Impede the Achievement of the Price Target: Key risks to our outlook include PWER's inability to gain share outside of Europe, incremental pricing pressure in the inverter market beyond our current expectations, and the potential emergence of lower cost players from regions such as China. Moreover, if current solar industry challenges persist, this could negatively impact overall demand for PV systems.

Tesla Motors Inc. (TSLA)

Valuation Methodology: Our price target of $38 equates to 15x our CY13 EPS estimate of $2.50, equates to 38x our CY12 EPS estimate of $1.02.

Risks which May Impede the Achievement of the Price Target: We consider Tesla a binary event. If management is able to execute on its planned product roadmap, we see significant opportunities in the premium market for its vehicles particularly given technology differentiation and performance. However, the inability to execute - i.e. ramp its production line - could lead to an unravelling of its strategy and ultimately yield a severe cash crunch on its business. Other risks include an inability to differentiate its products from competition from larger scale, better capitalized OEMs.

Source: Barclays Capital

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Primary Stocks (Ticker, Date, Price)

A123 Systems Inc. (AONE, 08-Nov-2011, USD 3.16), 2-Equal Weight/2-Neutral

Ameresco Inc. (AMRC, 08-Nov-2011, USD 11.18), 1-Overweight/2-Neutral

Elster Group SE (ELT, 08-Nov-2011, USD 14.35), 1-Overweight/2-Neutral

First Solar Inc. (FSLR, 08-Nov-2011, USD 47.55), 2-Equal Weight/2-Neutral

GT Advanced Technologies Inc. (GTAT, 08-Nov-2011, USD 8.00), 2-Equal Weight/2-Neutral

Itron Inc. (ITRI, 08-Nov-2011, USD 38.17), 2-Equal Weight/2-Neutral

Power-One Inc. (PWER, 08-Nov-2011, USD 5.53), 1-Overweight/2-Neutral

Tesla Motors Inc. (TSLA, 08-Nov-2011, USD 31.84), 1-Overweight/2-Neutral

Materially Mentioned Stocks (Ticker, Date, Price)

Aixtron AG (AIXGn.DE, 08-Nov-2011, EUR 11.20), 2-Equal Weight/2-Neutral

Cree Inc. (CREE, 08-Nov-2011, USD 31.00), 2-Equal Weight/2-Neutral

SemiLEDs Corp. (LEDS, 08-Nov-2011, USD 3.82), 2-Equal Weight/2-Neutral

Veeco Instruments Inc. (VECO, 08-Nov-2011, USD 28.67), 2-Equal Weight/2-Neutral

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In addition to the stock rating, we provide sector views which rate the outlook for the sector coverage universe as 1-Positive, 2-Neutral or 3-Negative (see definitions below). A rating system using terms such as buy, hold and sell is not the equivalent of our rating system. Investors should carefully read the entire research report including the definitions of all ratings and not infer its contents from ratings alone.

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2-Equal Weight - The stock is expected to perform in line with the unweighted expected total return of the sector coverage universe over a 12-month investment horizon.

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Sector View

1-Positive - sector coverage universe fundamentals/valuations are improving.

IMPORTANT DISCLOSURES CONTINUED

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3-Negative - sector coverage universe fundamentals/valuations are deteriorating.

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ARM Holdings PLC (ARM.L)
ASML Holding NV (ASML.AS)
CSR plc (CSR.L)
Ericsson (ERICb.ST)
Infineon Technologies AG (IFXGn.DE)
Kudelski S.A. (KUD.S)
Logitech International SA (LOGN.VX)
Nokia (NOK1V.HE)
Pace plc (PIC.L)
STMicroelectronics NV (STM.PA)
Technicolor S.A. (TCH.PA)
TomTom NV (TOM2.AS)

U.S. Clean Technology & Renewables

A123 Systems Inc. (AONE)
Ameresco Inc. (AMRC)
Elster Group SE (ELT)
First Solar Inc. (FSLR)
GT Advanced Technologies Inc. (GTAT)
Itron Inc. (ITRI)
Power-One Inc. (PWER)
Tesla Motors Inc. (TSLA)

U.S. Display & Lighting

Aixtron AG (AIXG)
Corning Inc. (GLW)
Cree Inc. (CREE)
IPG Photonics (IPGP)
Orbotech (ORBK)
SemiLEDs Corp. (LEDS)
Veeco Instruments Inc. (VECO)

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